



COMPREHENSIVE MOTOR VEHICLE SERVICES & CONSULTING

Motor Vehicle Forensic Analysis Report

People of the State of New York v.
Nauman Hussain

CMVSC-18-VA-253

LOCATION OF CRASH: Intersection of State Routes 30 and 30A, Schoharie, New York

REFERENCED INVOLVED SUBJECT VEHICLE: 2001 Ford Excursion Stretch Limousine,
VIN 1FMNU40S51EB10299

VEHICLE OWNER: Shahed Hussain, DBA Prestige Limousine

VEHICLE OPERATOR: Scott T. Lisinicchia

DATE OF CRASH: October 6, 2018 @ 1355 Hours

NEW YORK STATE POLICE CASE NO.: G2018-1006

DOCKET REFERENCE CASE NO.: Ind. No. 2019-33

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People of New York v. Nauman Hussain

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MOTOR VEHICLE AUTOPSY FORENSIC INVESTIGATION SUMMARY

Case No: **CMVSC-18-VA-253**

People of the State of New York v. Nauman Hussain

At the request of personnel of the New York State Police, as well as that of District Attorney Susan Mallery of the Office of the District Attorney of Schoharie County for the State of New York, specific additional investigative, technological, and forensic procedures were initiated with respect to the single causal motor vehicle of a multiple fatality motor vehicle crash that occurred within the town of Schoharie, New York on October 6, 2018. The focus of the supplementary investigation included the post crash vehicle autopsy and related forensic analyses of specific components of the involved, causal 2001 Ford Excursion stretch limousine owned by Shahed Hussain, DBA Prestige Limousine. The initial vehicle autopsy forensic procedures and component analyses were conducted on October 14, 2018, and October 15, 2018, at the New York State Police, Troop G impound location, located in Latham, New York. This two day commitment was preceded by the review/analysis of documents relevant to the



motor vehicle crash, as well as comprehensive research of specific vehicle manufacturer data. State Police personnel present during certain segments of the vehicle autopsy at the New York State Police, Troop G location included New York State Police Investigator Jeremy Shultis, New York State Police Senior Investigator Michael MacIntosh, New York State Police Investigator Rob Mower, and New York State Police Trooper Travis Kline.

Due to the facts and circumstances of the multiple fatality motor vehicle crash resulting in this supplemental investigation, a crucial focus of the forensic vehicle autopsy in this matter was that of the braking system components of the 2001 Ford Excursion stretch limousine involved in the motor vehicle crash of October 6, 2018. This focus was supported by initial reconstruction assessment, with specific basis that of the notable span and prominent negative gradient of the roadway prior to the area of impact, as well as the established extreme rate of speed of the 2001 Ford Excursion stretch limousine at impact. Indeed, such reconstruction factors ostensibly suggest partial or aggregate vehicle braking system failure as a causal element of the crash. Accordingly, the foremost automotive technology investigative aspect in this matter was narrowed to that of the critical inspection, diagnostic procedures, testing, and analysis of the individual and interactive characteristics of the components which comprise the braking system of the 2001 Ford Excursion stretch limousine, inclusive of failure analysis, wear analysis, brake configuration, brake efficiency, repair history, etc.

BACKGROUND OF THE CASE, en brief

On October 6, 2018, at approximately 1355 hours, a multiple fatality motor vehicle crash occurred in the vicinity of the Apple Barrel Country Store, located at 115 State Route 30A in the town of Schoharie, New York. The motor vehicle crash, comprised of a series of contemporaneous and sequentially-related ultimate impacts, occurred when a 2001 Ford Excursion stretch limousine, bearing New York registration TOGALUX1, owned by Shahed Hussain, DBA Prestige Limousine and operated by employee Scott T. Lisinicchia, descended the significant roadway gradient of State Route 30 while traveling in a generally southwesterly



direction. Upon intersecting State Route 30A -- a "T Intersection", with State Route 30 traffic controlled by a Stop Sign -- the 2001 Ford Excursion stretch limousine operated by Scott Lisinicchia continued its extremely high speed trajectory, traversing State Route 30A, violently impacting a parked 2015 Toyota Highlander, and ultimately fiercely impacting an earthen embankment.

As the direct result of the impact of the crash of the 2001 Ford Excursion stretch limousine with the parked 2015 Toyota Highlander, two (2) pedestrians sustained fatal injuries. Additionally, as the direct result of the impact of the crash of the 2001 Ford Excursion stretch limousine with the earth embankment, all eighteen (18) occupants of the limousine -- including operator Scott Lisinicchia -- sustained fatal injuries.

CRASH SCENE LOCUS and TRAVEL APPROACH

The investigation of this multiple fatality crash revealed that the 2001 Ford Excursion stretch limousine operated by Scott Lisinicchia had traveled in a somewhat easterly trajectory on State Route 7, then negotiating a right turn onto State Route 30. The 2001 Ford Excursion stretch limousine then traveled in a somewhat southwesterly trajectory on State Route 30, ultimately descending a substantial downhill gradient of greater than one (1) mile in length and realizing over six (6) degrees in negative gradient to a posted Stop Sign at the intersection of State Route 30A. Continuing the somewhat southwesterly high speed trajectory, the 2001 Ford Excursion stretch limousine sped past the posted Stop Sign, across State Route 30A, and impacted the aforementioned 2015 Toyota Highlander and earthen embankment located adjacent to the north of the Apple Barrel Country Store.

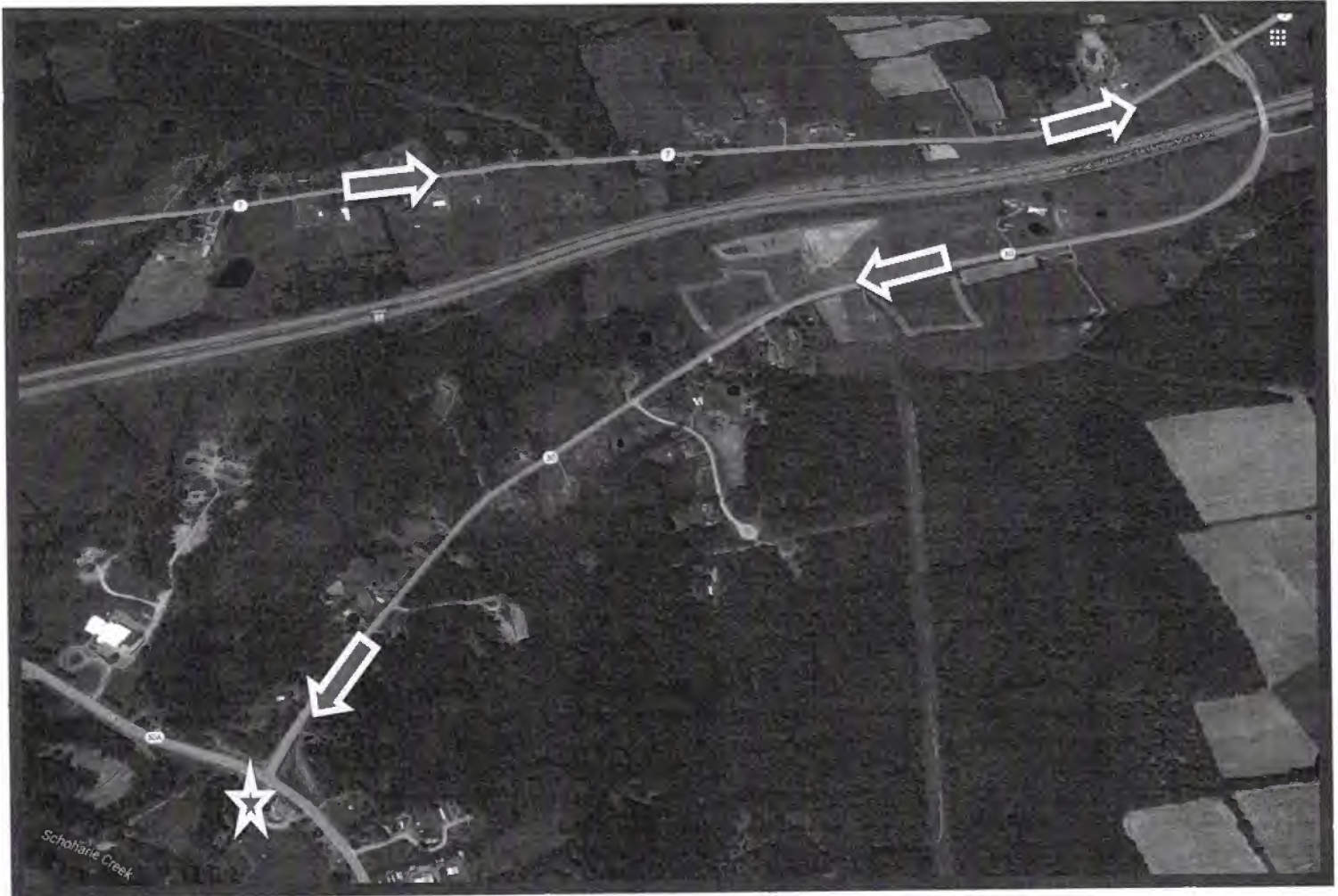
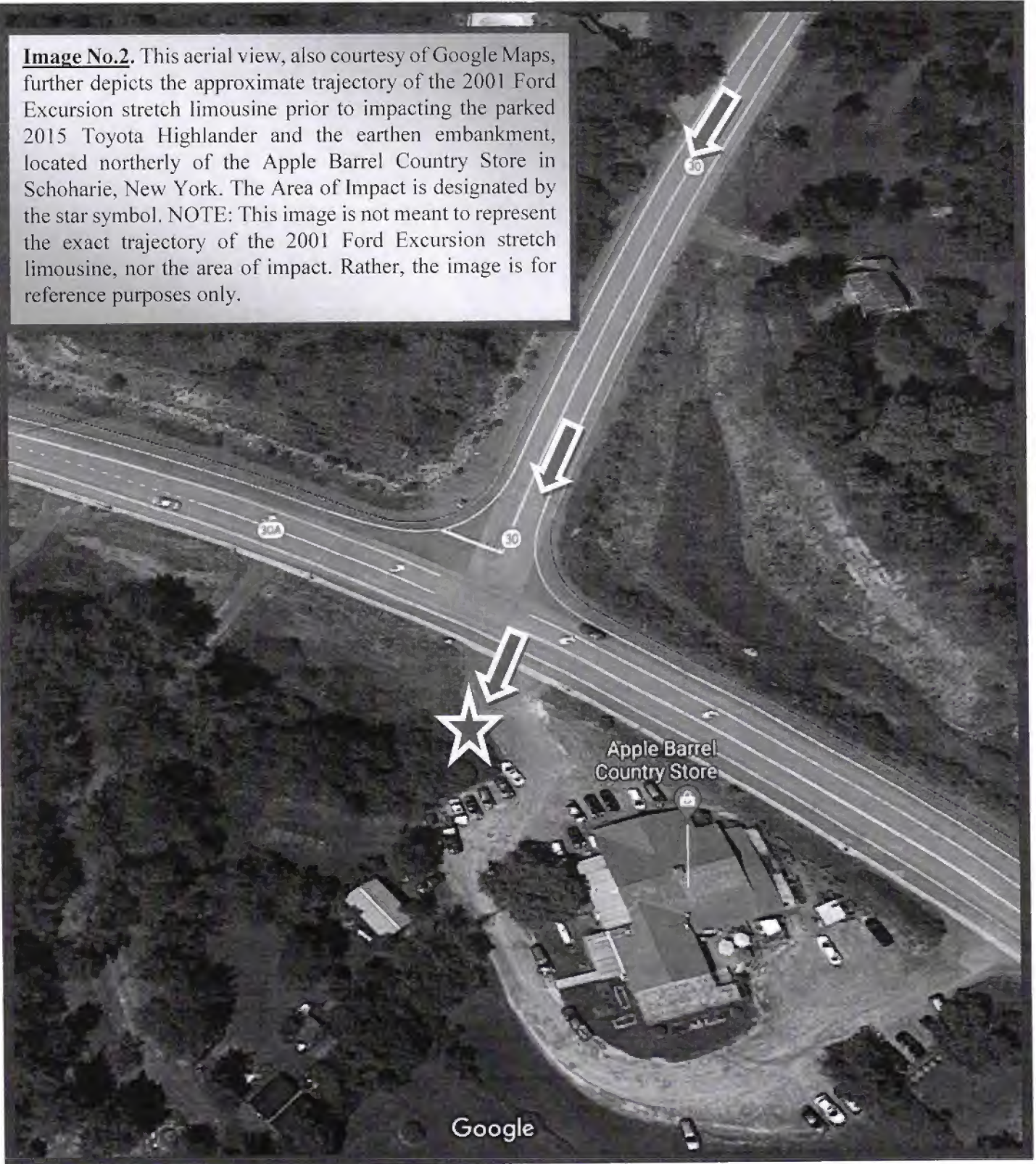


Image No.1. This aerial view, courtesy of Google Maps, depicts the approximate trajectory of the 2001 Ford Excursion stretch limousine prior to impacting the parked 2015 Toyota Highlander and the earthen embankment, located northerly of the Apple Barrel Country Store in Schoharie, New York. The Area of Impact is designated by the star symbol. NOTE: This image is not meant to represent the exact trajectory of the 2001 Ford Excursion stretch limousine, nor the area of impact. Rather, the image is for reference purposes only.



Image No.2. This aerial view, also courtesy of Google Maps, further depicts the approximate trajectory of the 2001 Ford Excursion stretch limousine prior to impacting the parked 2015 Toyota Highlander and the earthen embankment, located northerly of the Apple Barrel Country Store in Schoharie, New York. The Area of Impact is designated by the star symbol. NOTE: This image is not meant to represent the exact trajectory of the 2001 Ford Excursion stretch limousine, nor the area of impact. Rather, the image is for reference purposes only.



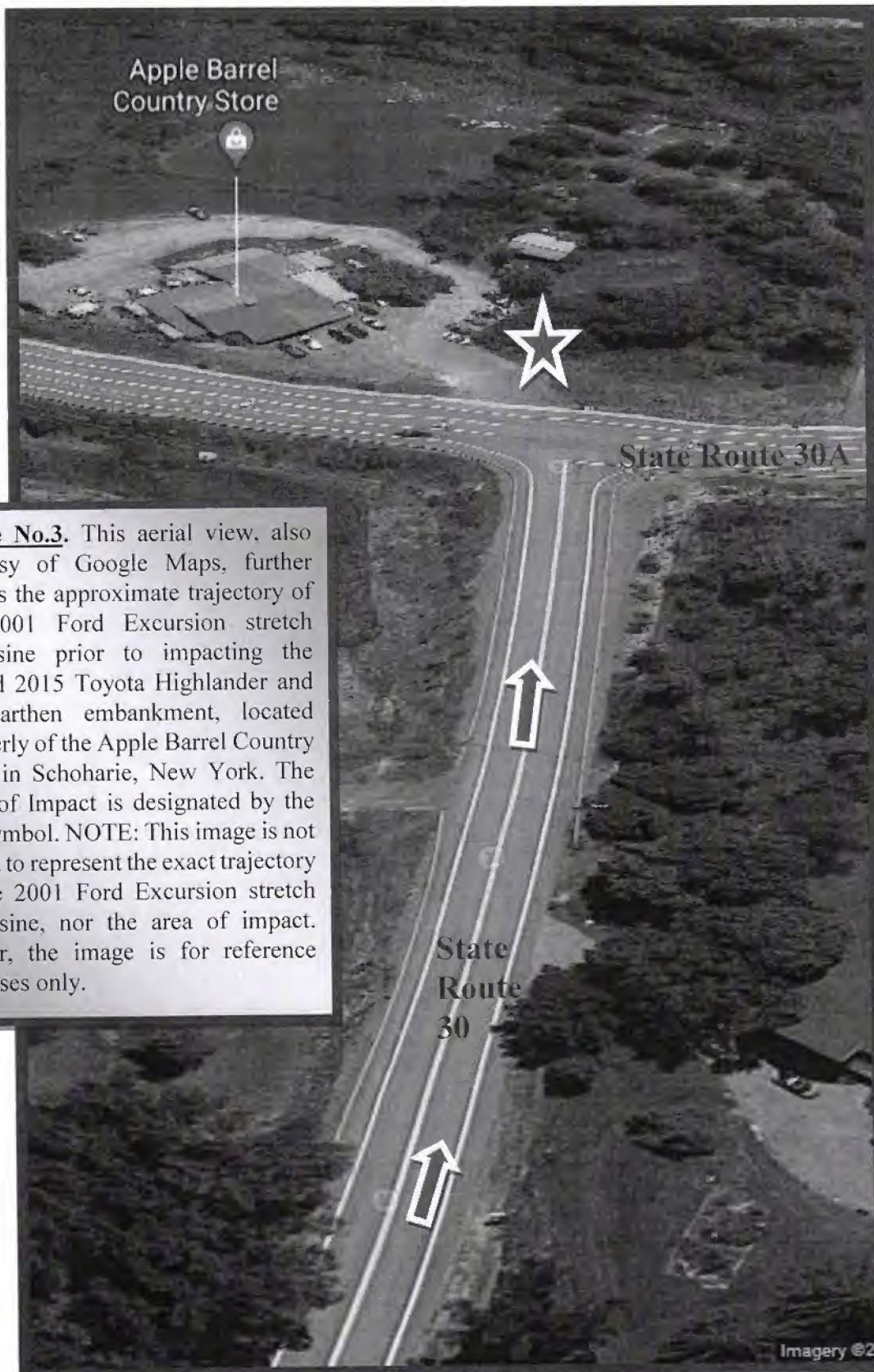


Image No.3. This aerial view, also courtesy of Google Maps, further depicts the approximate trajectory of the 2001 Ford Excursion stretch limousine prior to impacting the parked 2015 Toyota Highlander and the earthen embankment, located northerly of the Apple Barrel Country Store in Schoharie, New York. The Area of Impact is designated by the star symbol. NOTE: This image is not meant to represent the exact trajectory of the 2001 Ford Excursion stretch limousine, nor the area of impact. Rather, the image is for reference purposes only.



THE INVOLVED VEHICLE – 2001 FORD EXCURSION STRETCH LIMOUSINE

According to specifications provided by the Ford Motor Company, the subject vehicle of the vehicle autopsy and related focused forensics investigation, testing, and analysis of braking system components in this case is as follows:

MANUFACTURER MODEL YEAR - 2001

MANUFACTURER - FORD MOTOR COMPANY

VEHICLE LINE - EXCURSION

BODY CAB STYLE - REGULAR WAGON

VERSION/SERIES - 250 SERIES

VEHICLE IDENTIFICATION NUMBER - 1FMNU40S51EB10299

PRODUCT TYPE - TRUCK

END PRODUCT TYPE - MPV

The Ford Motor Company Build Data with respect to the referenced 2001 Ford Excursion reveals that the motor vehicle had a production date of October 22, 2000, with a Warranty Start Date of March 28, 2001. The motor vehicle was manufactured at the Ford Motor Company Kentucky Truck Plant.

The 2001 Ford Excursion is that of rear wheel drive, with a rear axle ratio of 3.73:1. The vehicle was manufactured with the 6.8 liter, SOHC, EFI, NA V10 gasoline engine, coupled to a E4OD/4R100 automatic transmission.



➤ Subsequent Alterations of the 2001 Ford Excursion

Per vehicle build data provided by the Ford Motor Company, the 2001 Ford Excursion in this case was manufactured on October 22, 2000 as an "Excursion Regular Wagon". According to research conducted by New York State Police Investigators, the motor vehicle was then shipped to Friendly Ford, Inc., located at 3241 South Glenstone Avenue in Springfield, Missouri. The 2001 Ford Excursion was subsequently modified to that of a "stretch limousine" by 21st Century Coach, Inc., then located at 11 White Oak Road, Building 6, Rogersville, Missouri. The 2001 Ford Excursion stretch limousine was first titled in the state of New York on April 4, 2001, to Lawrence Macera of 137 Lark Street in Albany.

The 2001 Ford Excursion in this case was originally manufactured by the Ford Motor Company and designated as a "Multipurpose Passenger Vehicle"¹, which is considered Certification as a "Completed Vehicle"², as opposed to an "Incomplete Vehicle"³. Therefore, the transformation of the 2001 Ford Excursion to that of a "stretch limousine" -- a process which entails sectioning the motor vehicle and welding additional lengths of structural frame and sheet metal body components -- is that of "Altering a Certified Vehicle" and subject to applicable federal regulations⁴. Most importantly, the "Altering of a Certified Vehicle" must ultimately ensure that the subject vehicle is in compliance with all applicable Federal Motor Vehicle Safety Standards⁵, inclusive of Federal Motor Vehicle Safety Standard No. 105, applicable to motor vehicles equipped with hydraulic brake systems⁶.

The altering of a Certified Completed Vehicle, as in the case of the involved 2001 Ford Excursion stretch limousine, is also mandated pursuant to federal regulations to result

1 See 49CFR571.3.

2 See 49CFR567.3.

3 *Id.*

4 See 49CFR567.7.

5 See 49CFR571.1, et seq.

6 See 49CFR571.105.



in the permanent affixing of an "Altered Vehicle Certification Label" to the left front door hinge pillar, door-latch post, or the door edge that meets the door-latch post. The Altered Vehicle Certification Label shall provide for Certifications inclusive of compliance with all applicable Federal Motor Vehicle Safety Standards; increased vehicle Gross Vehicle Weight Rating; increased vehicle Gross Axle Weight Ratings; and change in the Classification of the Vehicle⁷.

The examination of the 2001 Ford Excursion stretch limousine in this case revealed only the original manufacturer (Ford Motor Company) Certification Completed Vehicle Label, with no Altered Vehicle Certification Label detected, despite the known alterations of 2001 inclusive of "stretching" the vehicle by sectioning and welding additional frame and sheet metal body components; increasing the seating capacity beyond that of the original manufacturer's Certification of a Completed Multipurpose Passenger Vehicle; and presumably increasing the Gross Vehicle Weight Rating of the motor vehicle. The absence of the required Altered Vehicle Certification Label is consistent with previous Driver/Vehicle Examination Reports of the New York Department of Transportation⁸, dated 09/04/2018 and 03/21/2018. In contrast, however, a New York Department of Transportation Driver/Vehicle Examination Report dated 05/09/2015⁹ reveals no such deficiency, with a seating capacity of eighteen (18).

⁷ See 49CFR567.7; 49CFR567.4; and 49CFR571.3 (CFR Title 49, 2001)

⁸ See DRIVER/VEHICLE EXAMINATION REPORTS, NYDOT, Nos. NYMC35000906, NYMC35000868.

⁹ See DRIVER/VEHICLE EXAMINATION REPORT, NYDOT, No. NYMC49000739.



➤ Gross Vehicle Weight Ratings

At the time of manufacture, the 2001 Ford Excursion in this case was assembled with components and tire ratings to establish the following GAWR (Gross Axle Weight Ratings) and GVWR (Gross Vehicle Weight Rating) configurations:

2001 Ford Excursion Manufactured Vehicle Weight Ratings		
Gross Vehicle Weight Rating:	8600 lbs.	(Build Code AAZKM)
Gross Axle Weight Rating:	Axle 1	4700 lbs. (Build Code DYFBE) 4100 lbs. with LT265/75R16D tires
	Axle 2	7000 lbs. (Build Code EJALB) 5250 lbs. with LT265/75R16D tires

➤ Vehicle Safety Campaigns

Ford Motor Company records indicate that the involved 2001 Ford Excursion is the subject of one open safety recall, designated as Safety Recall 01S21. The safety concern associated with the named recall is that of the possibility of the driver and/or front seat passenger outboard seat belt buckle not fully latching.

Potential Causal Aspects of Safety Campaign to Motor Vehicle Crash of October 6, 2018

- NONE.



VEHICLE FORENSIC INVESTIGATIVE RESULTS

The vehicle autopsy and related forensic analyses of specific components of the 2001 Ford Excursion stretch limousine commenced on October 14, 2018 at the New York State Police Troop G Impound Area. To provide for further, more precise forensic analyses and evaluation of certain individual components of the vehicle, the disassembly, removal, and securement of specified parts of the 2001 Ford Excursion stretch limousine occurred over the two day period. The resulting thirty (30) boxes of components removed from the 2001 Ford Excursion stretch limousine were processed as evidence, with most boxes later transferred to the climate controlled facility areas of CMVSC for additional forensic analyses over an approximate eight (8) week period.

In addition to vehicle component references provided elsewhere by and through this expert report, the forensic analyses of the 2001 Ford Excursion limousine in the case revealed the following information:

➤ *Body and Frame Deficiencies*

Due to the violent energy forces realized by the 2001 Ford Excursion stretch limousine attributable to the extraordinary level of kinetic energy based upon the mass of the vehicle and extreme velocity at impact, remarkable frontal contact, induced, and structural damage was sustained by the vehicle. These crash related deficiencies were inclusive of frontal frame side sway, frontal frame mash, and frontal frame twist. The extent of the impact structural damage resulted in notable displacement of the engine and transmission.



Image No.4. This photograph depicts the severity of the frontal structural damage sustained by the 2001 Ford Excursion stretch limousine due to the violent impact forces of the crash. Note that the structural integrity of the vehicle rearward of the B-Pillar -- that of the area of "stretch" alteration -- remains intact.



Independent of the extensive crash related structural damage, the examination of the 2001 Ford Excursion stretch limousine revealed significant areas of sheet metal rust through, some areas of which had been previously repaired with materials which obviously did not conform to original manufacture yield strength standards. These deficiencies, albeit not causal to the multiple fatality motor vehicle crash of October 6, 2018, were indeed within the purview of sustained neglect of proper maintenance mandated for this vehicle.



Image No.5. This photograph depicts an area of rust-through, located at the left lower side of the 2001 Ford Excursion stretch limousine. This deficiency, which obviously creates a reduction in the integrity of the body panel, as well as allowing for exhaust gases to enter the passenger compartment of the vehicle, reflects that of sustained neglect of mandated vehicle maintenance.



Image No.6. This photograph depicts an area of rust-through, located at the right lower side of the 2001 Ford Excursion stretch limousine. This deficiency, which obviously creates a reduction in the integrity of the body panel, as well as allowing for exhaust gases to enter the passenger compartment of the vehicle, also reflects that of sustained neglect of mandated vehicle maintenance.

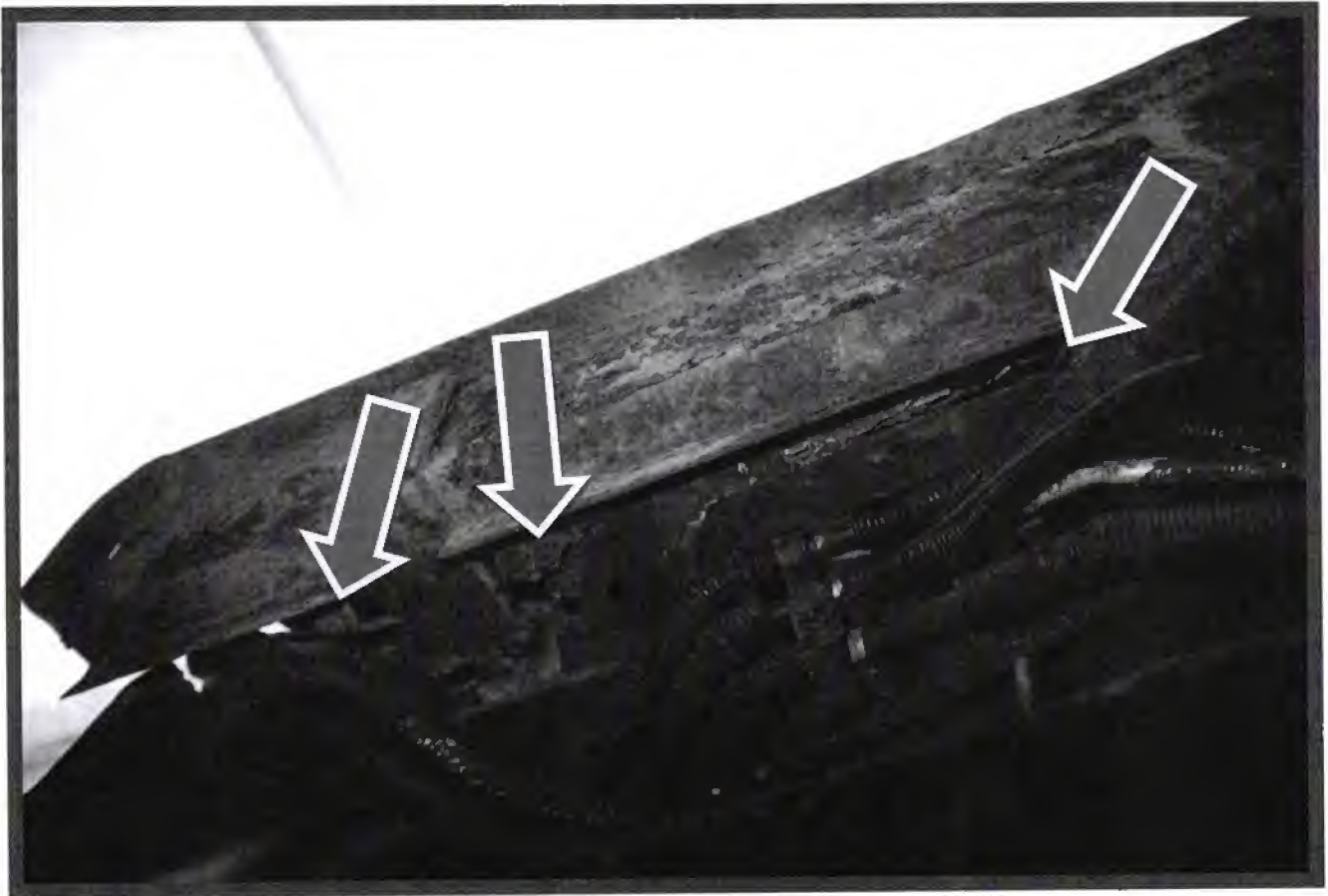


Image No.7. The Red Arrows of this photograph depicts areas of rust-through, located at the right rear floor area of the 2001 Ford Excursion stretch limousine. This deficiency, which obviously creates a reduction in the integrity of the floor panel, as well as allowing for exhaust gases to enter the passenger compartment of the vehicle, further reflects that of sustained neglect of mandated vehicle maintenance.



➤ Transmission Disassembly/Analyses

The 2001 Ford Excursion stretch limousine in this case was manufactured and equipped with a Ford E4OD, 4R100 automatic transmission. As a continued segment of the forensic vehicle analyses in this case, and pursuant to an additional Search Warrant, the transmission was removed from the vehicle for the purpose of disassembly and examination. Highlights of the examination and analyses of the automatic transmission are as follows:

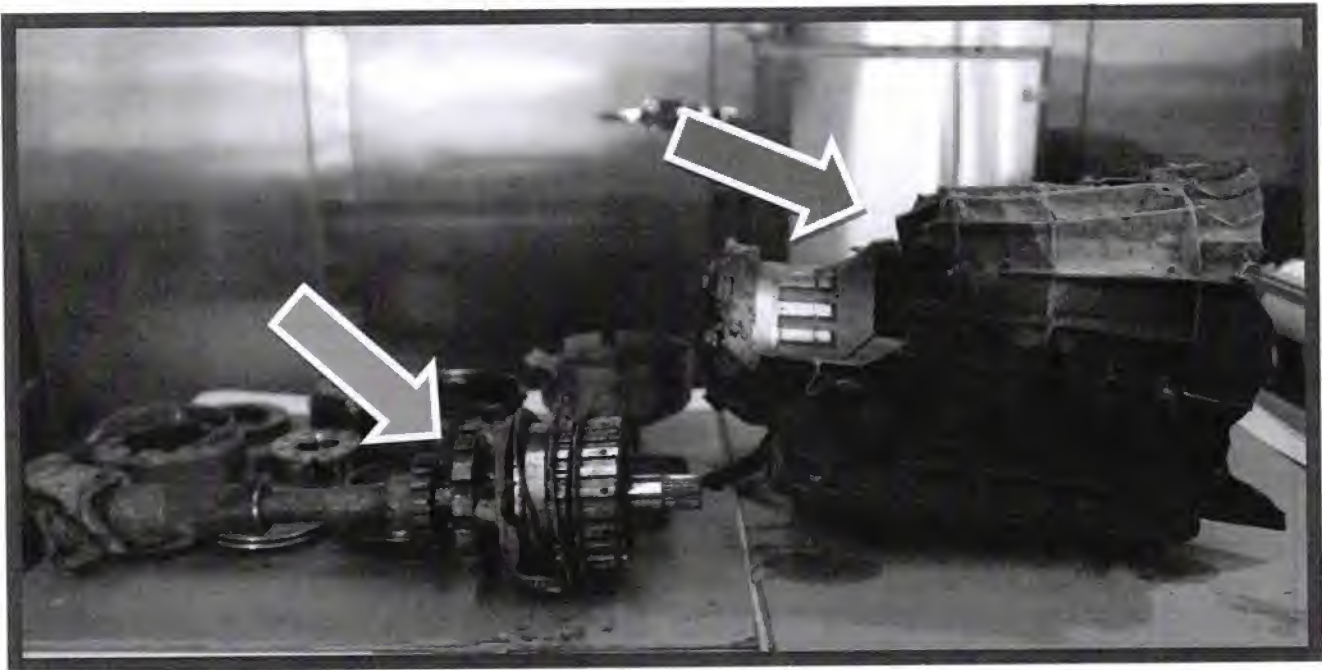


Image No.8. This photograph depicts the E4OD/4R100 automatic transmission removed from the involved 2001 Ford Excursion stretch limousine. The Blue Arrow denotes the area of the fractured transmission Main Case, with related Extension Housing separation, as well as Output Shaft (Green Arrow) separation. This substantial damage was the result of the extreme forces associated with crash impact.

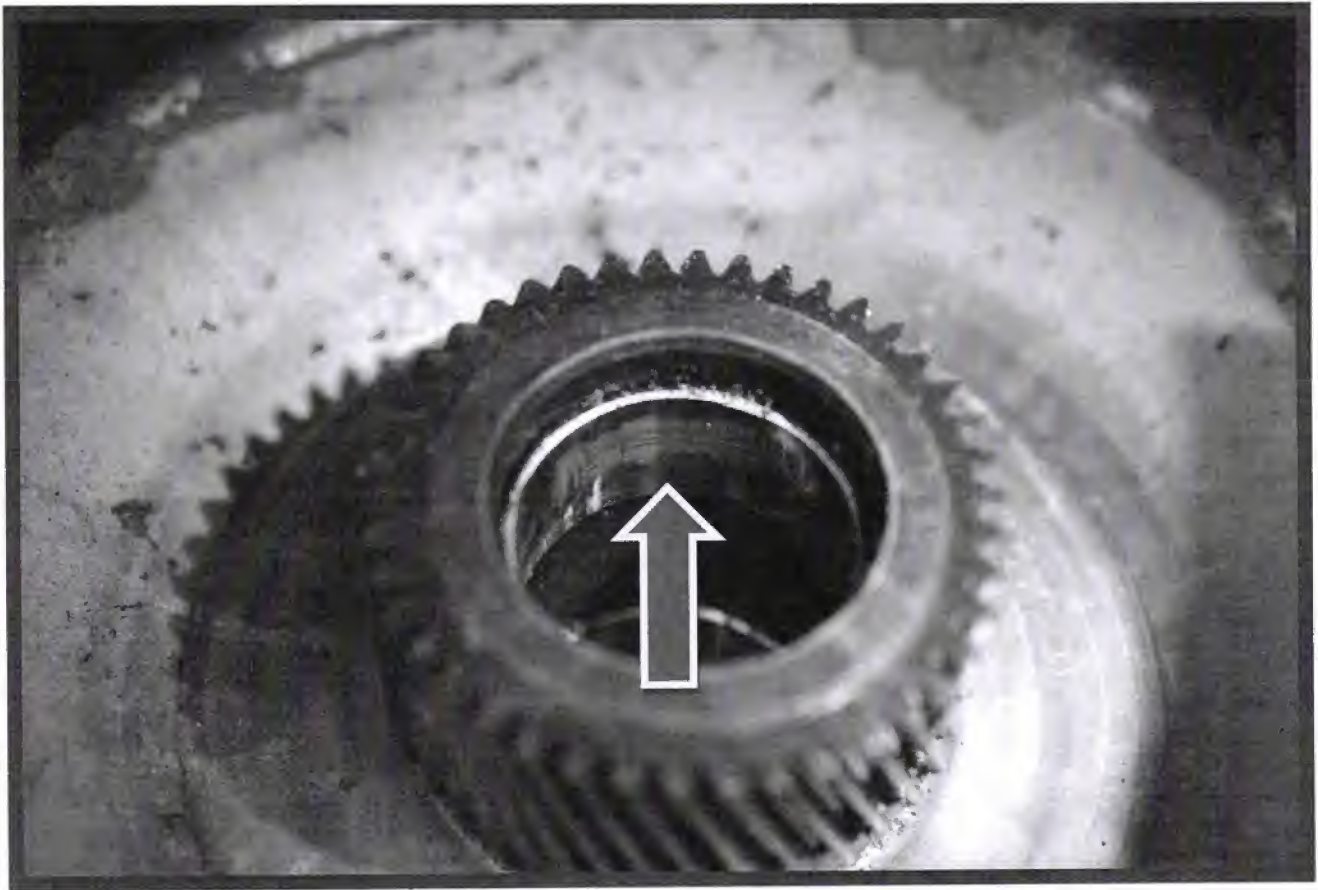


Image No.9. This photograph depicts the Forward/Reverse Sun Gear removed from the E4OD/4R100 automatic transmission of the involved 2001 Ford Excursion stretch limousine. The Red Arrow denotes the area of significant bushing wear, consistent with the lack of proper vehicle maintenance.

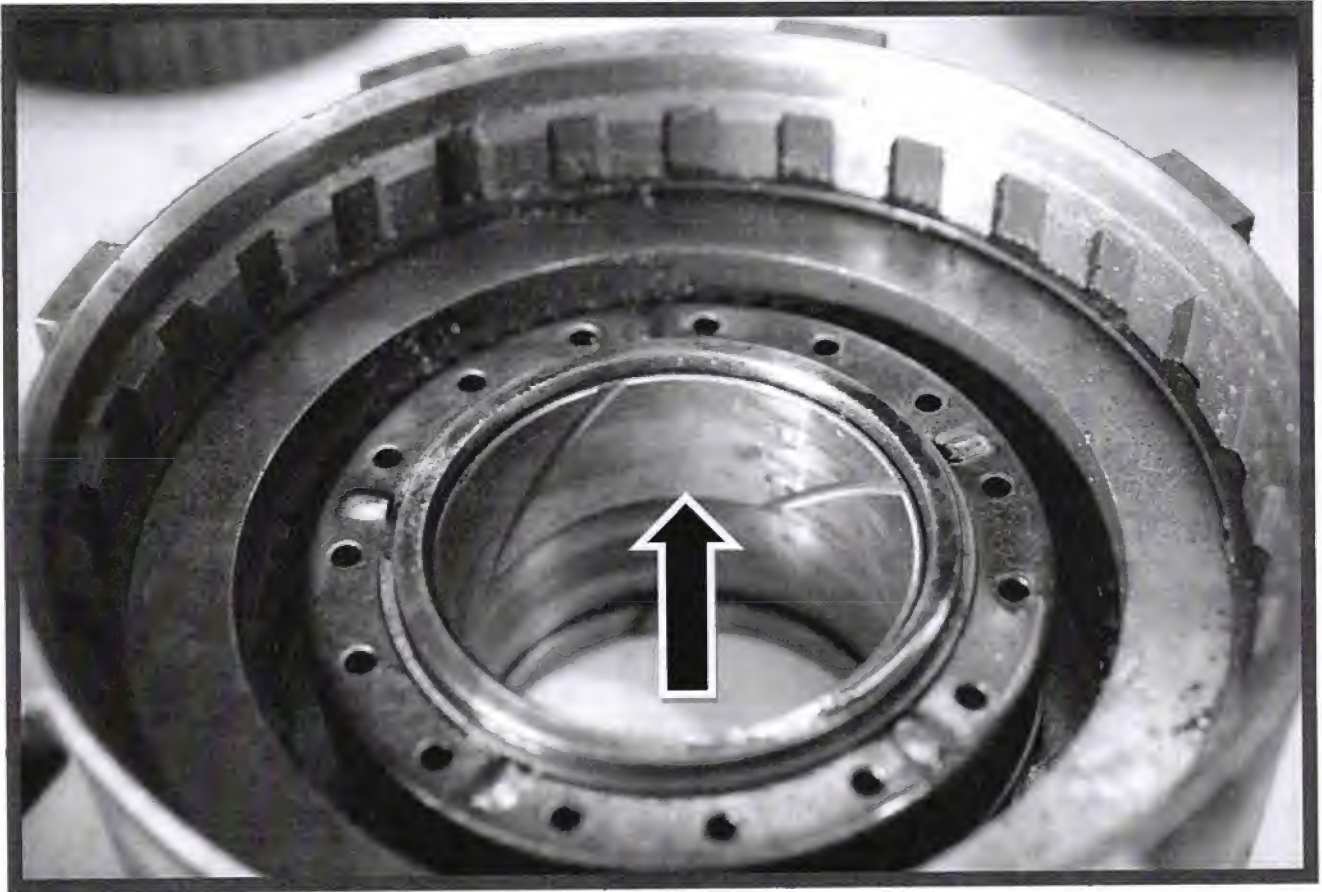
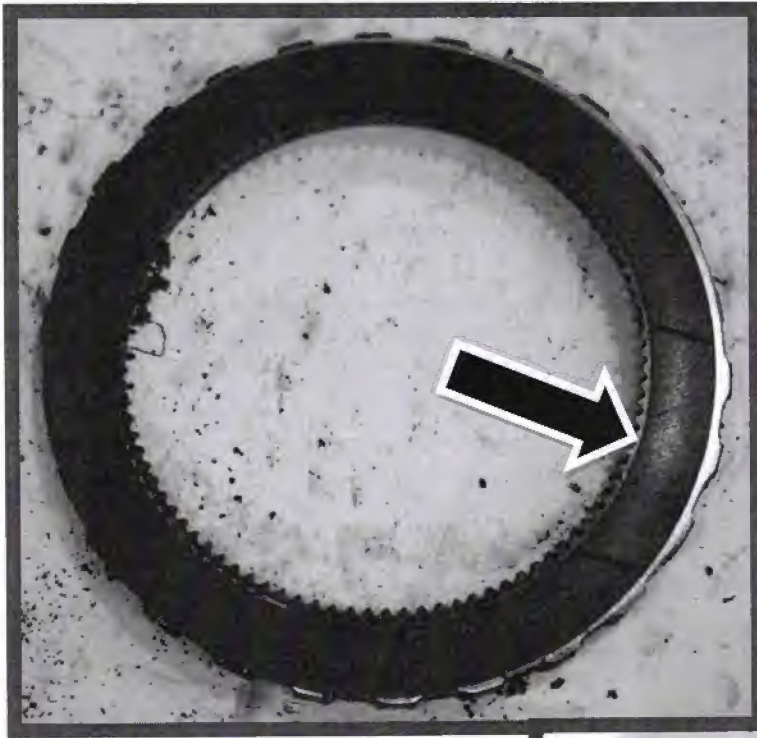
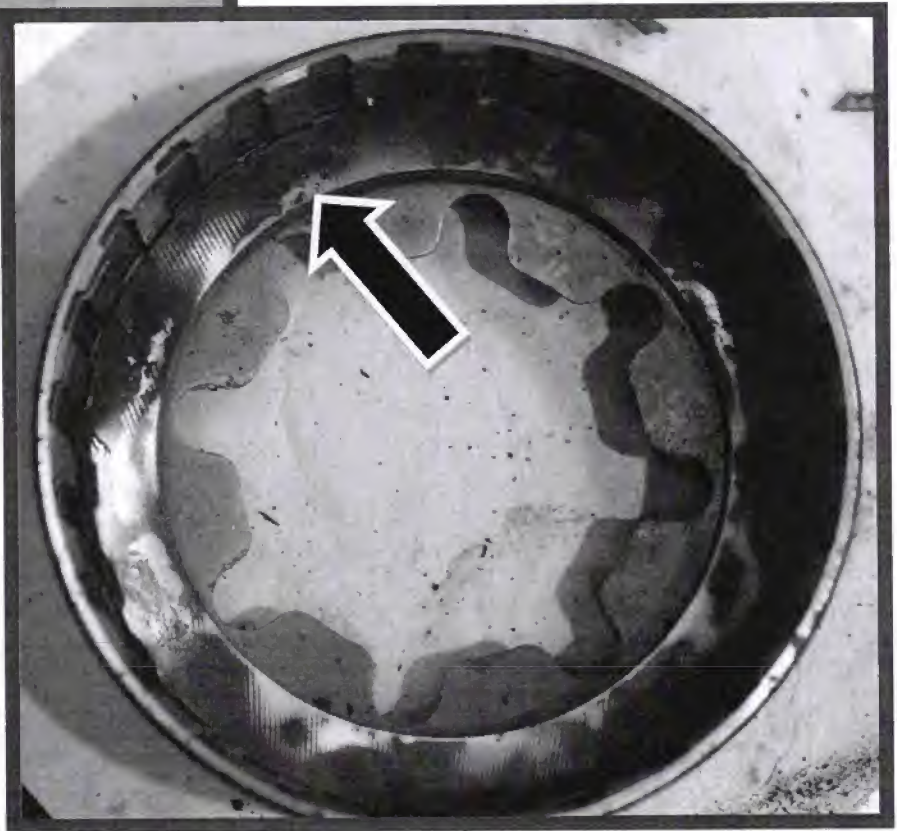


Image No.10. This photograph depicts the Direct Drum removed from the E4OD/4R100 automatic transmission of the involved 2001 Ford Excursion stretch limousine. The Black Arrow denotes the area of significant bushing wear, consistent with the lack of proper vehicle maintenance.



Images No.11a & 11b. These photographs depict two of the Forward Clutch friction discs removed from the E4OD/4R100 automatic transmission of the involved 2001 Ford Excursion stretch limousine. The Black Arrows denote the comparison of common friction material of a friction disc (Top Photo), to that of a friction disc of which the friction material has delaminated and overheated. This condition is consistent with the lack of proper vehicle maintenance.





Summary of Analysis, E4OD/4R100 Automatic Transmission Components:

The disassembly and analyses of the components of the E4OD/4R100 automatic transmission removed from the involved 2001 Ford Excursion stretch limousine revealed evidence of the lack of proper maintenance to the concerning degree of notable transmission slippage when accelerating the vehicle from a stopped position. This condition would have been obvious to anyone who drove the vehicle, or experienced the vehicle accelerating from a stop.

➤ **Throttle Body/Accelerator System**

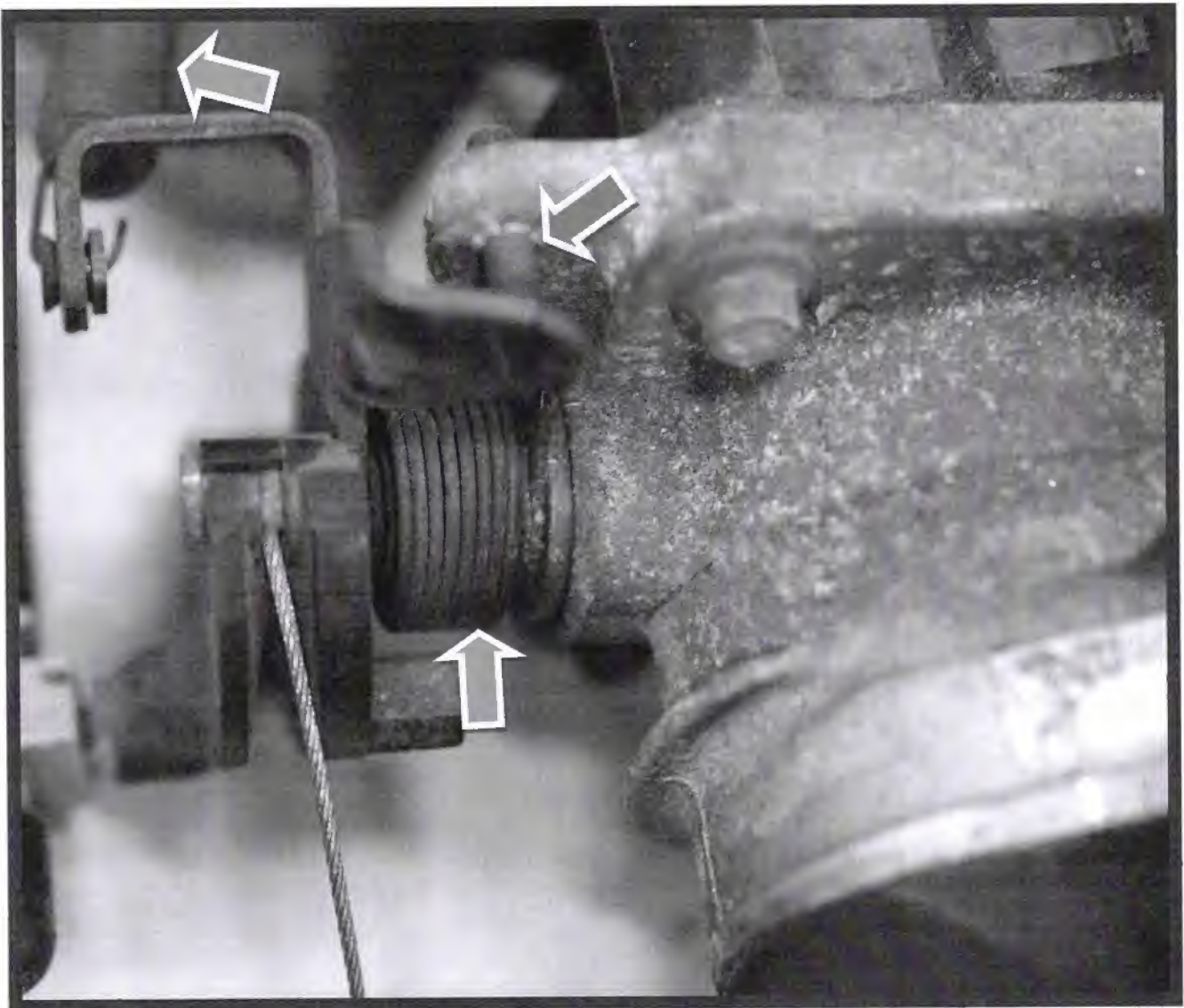
The 2001 Ford Excursion stretch limousine in this case was manufactured with a mechanical design accelerator system, consisting of 1)The Accelerator Pedal Assembly; 2)Throttle Cable Assembly; and 3)Throttle Body Linkage. The three component assemblies were removed from the vehicle for examination, testing, and analysis, with results as follows:



Image No.12. This photograph depicts the Throttle Body of the involved 2001 Ford Excursion stretch limousine prior to removal for examination. The Blue Arrow denotes the Throttle Plate linkage, which is at a position of partially opened Throttle Plates. This was the direct result of the violent impact forces, which resulted in notable structural frame deformation; displacement of the engine/transmission assembly; and firewall deformation, thus retracting the throttle cable. Once throttle cable tension was released, the Throttle Plates of the Throttle Body firmly returned to the idle position.



Image No.13. This photograph depicts the Throttle Body of the involved 2001 Ford Excursion stretch limousine during subsequent examination/analysis. The Blue Arrow denotes the Throttle Plate linkage, which is firmly at a position of closed Throttle Plates. No binding of Throttle Plate transition was present. The Orange Arrows denote the multiple intact and functional Throttle Plate Return Springs, mandated by applicable Federal Motor Vehicle Safety Standards. Digital Force Gauge testing revealed positive spring return to idle force of 7.733 lbs.





The examination/analysis of the accelerator pedal assembly of the 2001 Ford Excursion stretch limousine in this case revealed that of an operational component, with freely moving fulcrum with no binding. The linkage of the accelerator pedal assembly exhibited deformation consistent with the aforementioned firewall displacement from impact forces.

The pre-removal examination of the Throttle Body components also revealed that of a considerable engine vacuum leak present at a vacuum hose location. The noted condition of the source of the vacuum leak was consistent with that of a pre-existing condition.

Summary of Analysis, Accelerator/Throttle Body Components: *The testing and analyses of the components of the Accelerator System/Throttle Body removed from the involved 2001 Ford Excursion stretch limousine revealed that of a pre-crash properly operating system, with smooth transition and positive Throttle Plate spring return to the idle position.*

The pre-existing condition of the vacuum leak at the Throttle Body would have resulted in an obvious deterioration of engine operational quality, especially during idle conditions. This condition certainly falls within the realm of proper vehicle maintenance, and the neglect thereof.



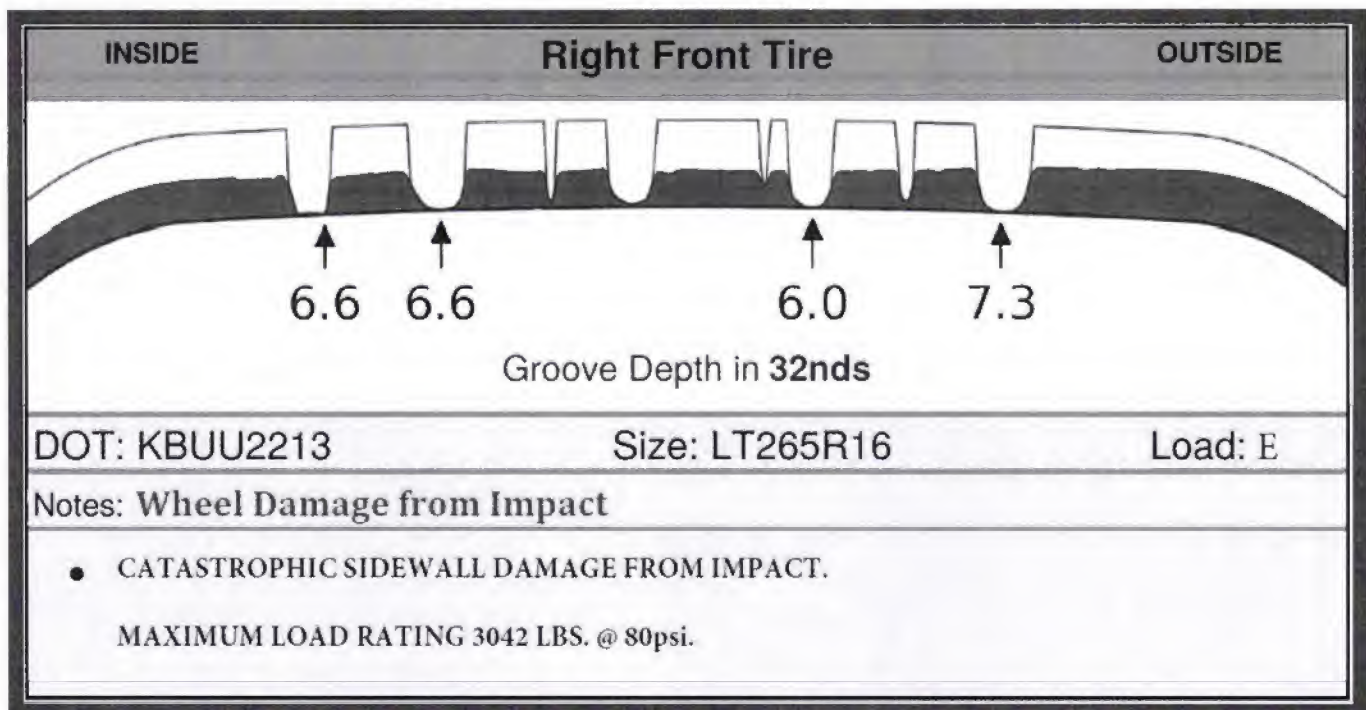
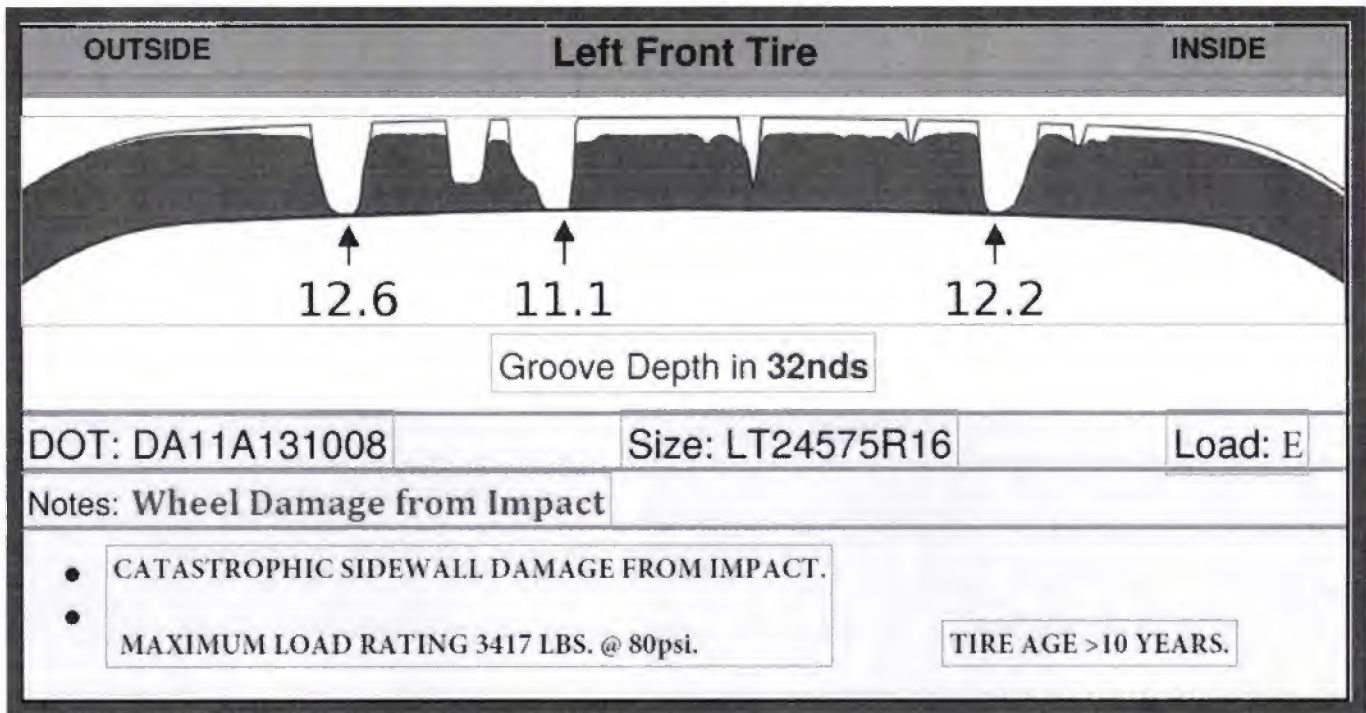
➤ *Steering/Suspension Components*

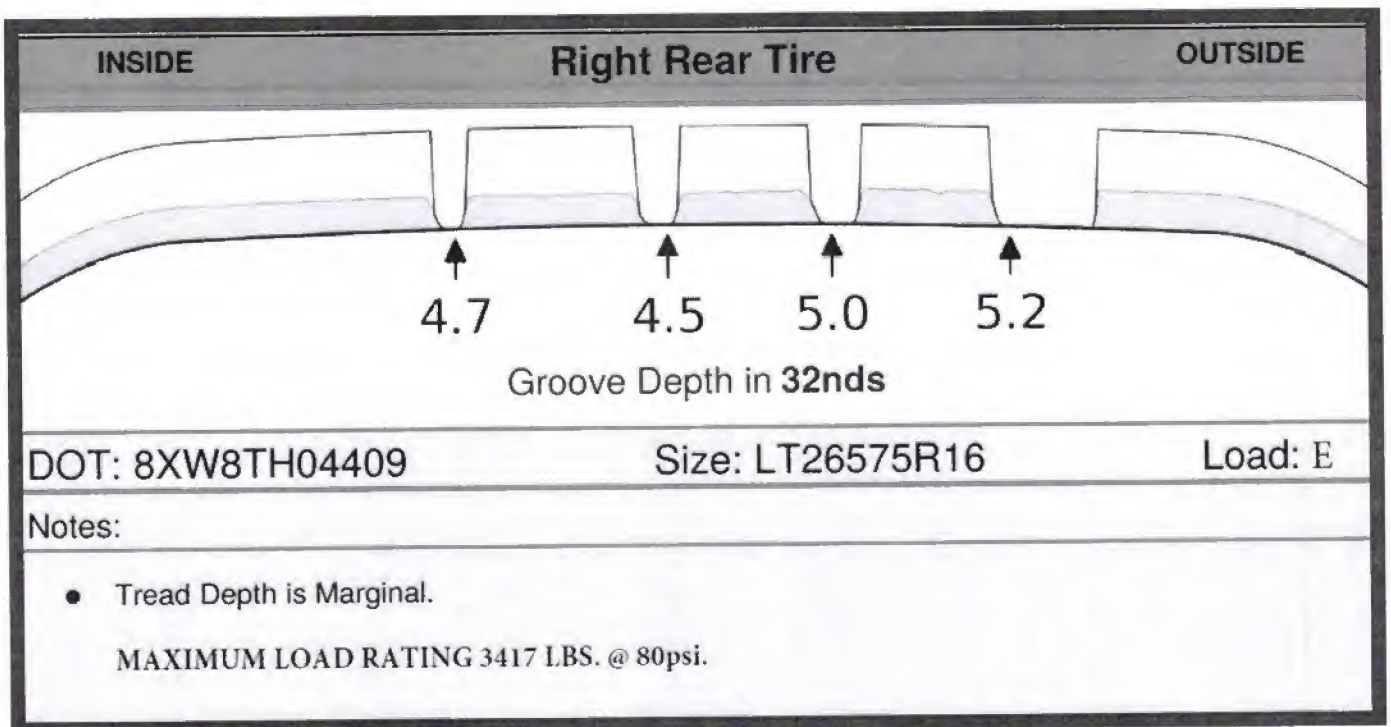
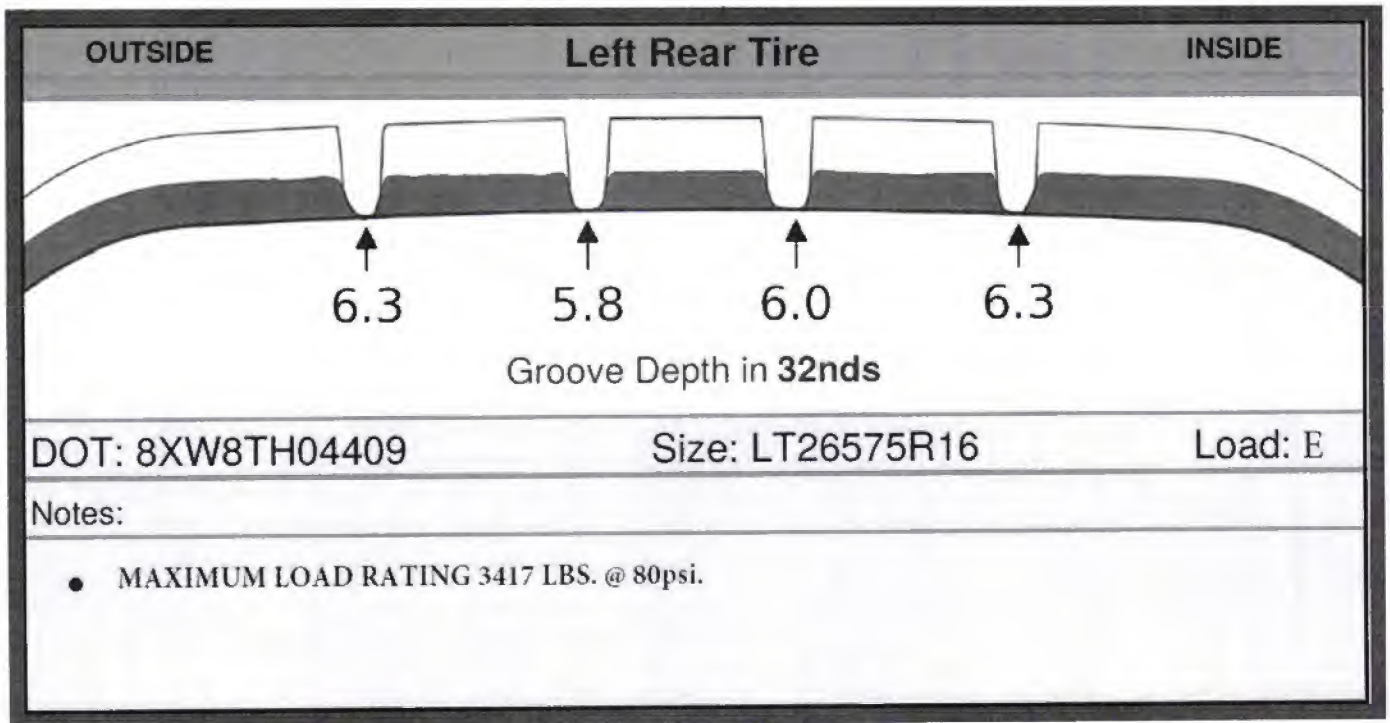
The 2001 Ford Excursion stretch limousine in this case was manufactured with front steering/suspension components comprised of a Front Axle I-Beam; Left/Right Radius Arms; Coil Springs; Front Stabilizer Bar; Front Spindles; Steering Gear, Drag Link; Ball Joints; and Spindle Rods. The examination of the steering/suspension components revealed obvious deformation resulting from the intensity of impact forces. There was no evidence of pre-impact component failure through the examination procedures implemented, or through scene and pre-crash roadway evidence.

➤ *Tires/Wheels of the Vehicle*

The inspection of the four tires and wheels of the 2001 Ford Excursion stretch limousine in this case revealed no evidence of pre-crash failure conditions. Tire tread depth, performed with specialized laser equipment, was sufficient at all locations. However, the wheel installed at the left front of the vehicle was that of steel design, as opposed to the original manufacture alloy composition wheels located at the remaining three locations on the vehicle. Additionally, the tire installed at the left front of the vehicle was that of a size of LT245/75R16, while the tire size at the remaining three locations was that of LT265/75R16 -- the original manufacturer tire size.

The results of the specialized tire scan laser equipment, along with tire notations, are provided on the next two pages of this expert report.







Summary of Analysis, Tires/Wheels of the Vehicle: *The examination and analyses of the tire/wheel components of the 2001 Ford Excursion stretch limousine in this case revealed that although tire failure was not a causal aspect of this multiple fatality crash, the following deficiencies existed during the pre-crash operation of the vehicle:*

1) Left Front Wheel, Steel Construction as opposed to Right Front Wheel, Alloy Construction.

This mismatch condition results in the imbalance of unsprung weight, left to right front.

2) Left Front Tire as opposed to Right Front Tire Size -- Mismatch.

This mismatch condition of tire sizes can result in steering pull during operation and braking.

3) Tire Age Exceeding Ten (10) Years, Left Front Tire.

This tire condition can result in catastrophic tire failure at highway speeds.

The above-described tire/wheel deficiencies are that of the neglect of mandated vehicle maintenance.



➤ Brake System Components

A primary realm of investigation in this matter, based upon the crash reconstruction facts of the case, was the comprehensive focus of the components comprising the braking system of the involved 2001 Ford Excursion stretch limousine. Indeed, overwhelming and succinct contentions of the large stretch limousine laden with seventeen (17) passengers and the driver traversing the intersection of State Route 30 and State Route 30A at an extremely high speed to impact mandated the forensic inspection, testing, and analyses of the braking system of the vehicle – inclusive of both individual and collective component configurations. Moreover, and in consideration of the significant gross weight of the 2001 Ford Excursion stretch limousine, critical areas of concern also encompassed that of brake system efficiency and performance, original equipment brake system component configuration, repair history, replacement brake system component configuration, etc.

The 2001 Ford Excursion in this case was manufactured by the Ford Motor Company with a four wheel anti-lock (ABS) brake system¹⁰, comprised of front disc brake components and rear disc brake components. The brake system incorporates a dual diaphragm vacuum brake booster, with a dual circuit, tandem master cylinder.

The specific results of the inspection, testing, and analyses of the braking system components of the 2001 Ford Excursion stretch limousine in this case, initially conducted on October 14 and October 15, 2018 at the New York State Police Troop G impound area, and subsequently more comprehensively conducted over an eight (8) week period within a controlled facility, are as described by and through the following pages of this expert report.

¹⁰ Ford Motor Company Build Code FEAAB.



BRAKE SYSTEM COMPONENTS, LEFT REAR

The 2001 Ford Excursion stretch limousine in this case was manufactured by the Ford Motor Company with left rear braking system components inclusive of:

- ✓ Rear Disc Brake Caliper, two piston sliding design.
- ✓ Rear Disc Brake Rotor, vented cast design.
- ✓ Rear Disc Brake Caliper Anchor Plate.
- ✓ Rear Disc Brake Caliper Adapter Plate.
- ✓ Rear Disc Brake Pads.

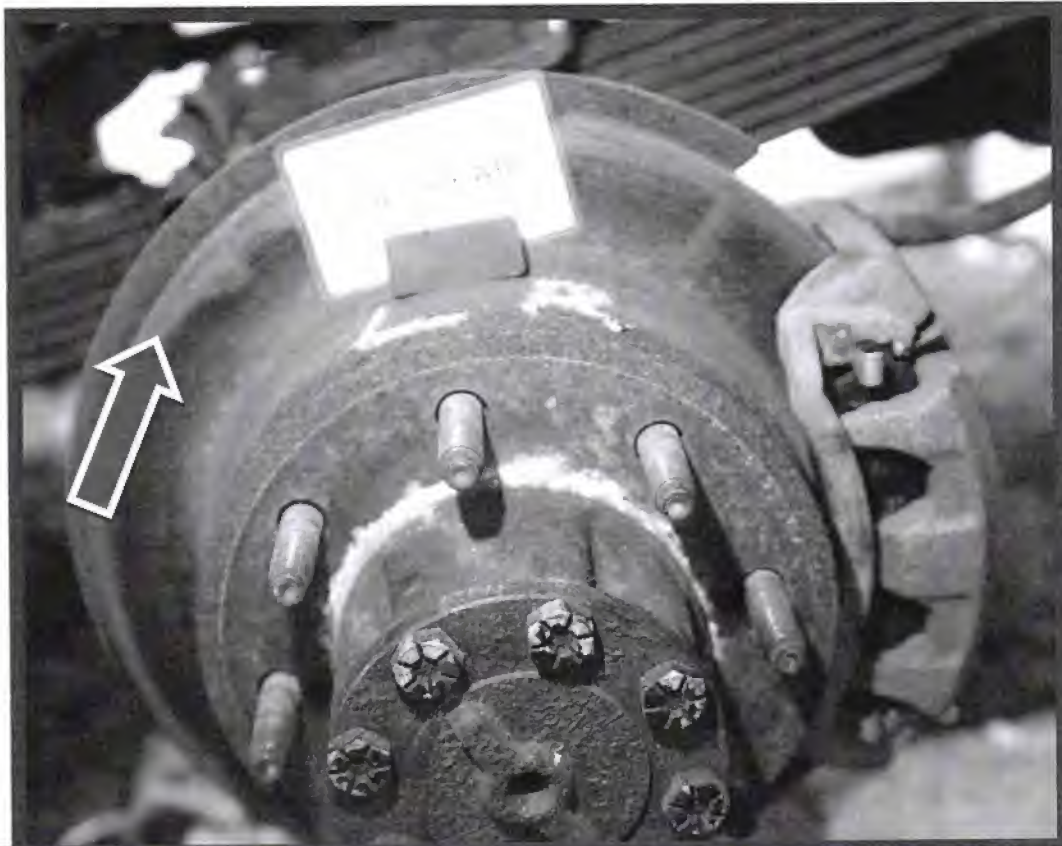


Image No.14. This photograph depicts the left rear disc brake components of the involved 2001 Ford Excursion stretch limousine prior to removal from the vehicle. Note the outer disc brake rotor swept area corrosion, which was a pre-existing condition (Red Arrow).



Disc Brake Caliper, Left Rear – The left rear disc brake caliper of the 2001 Ford Excursion stretch limousine exhibited slight casting oxidation, with both piston surfaces presenting insignificant exposure. This condition was consistent with the Repair Order of Mavis Discount Tire dated May 11, 2018¹¹, which indicated replacement of the Brake Caliper, Brake Hose, and Brake Pads. Brake dust presence was nearly nonexistent.

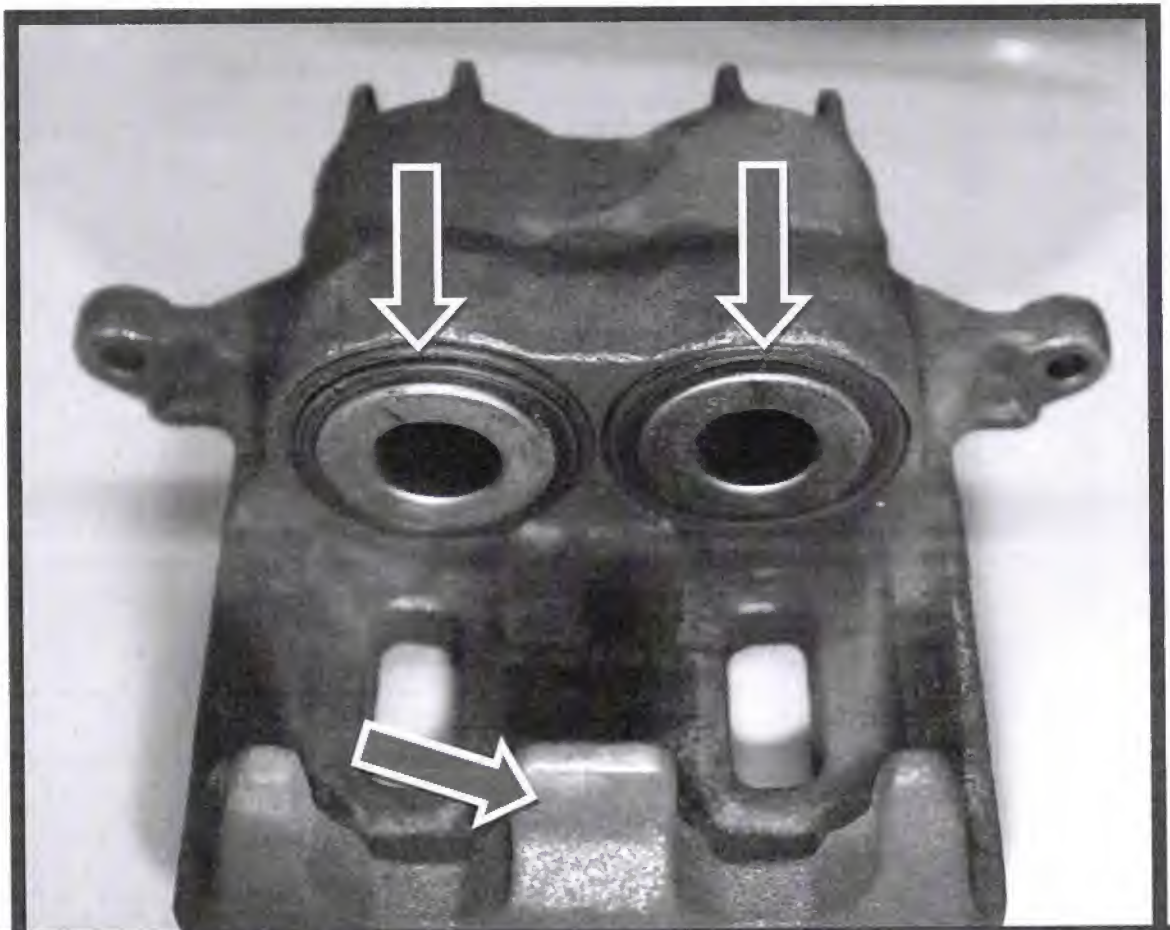


Image No.15. This photograph depicts the left rear disc brake caliper of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Note the state of the cast caliper body, as well as that of the two caliper pistons and piston seals (Blue Arrows). The condition of the component was consistent with that of replacement per the Repair Order of Mavis Discount Tire, dated May 11, 2018.

¹¹ See Invoice Number 758880, Mavis Discount Tire, 05/11/2018.

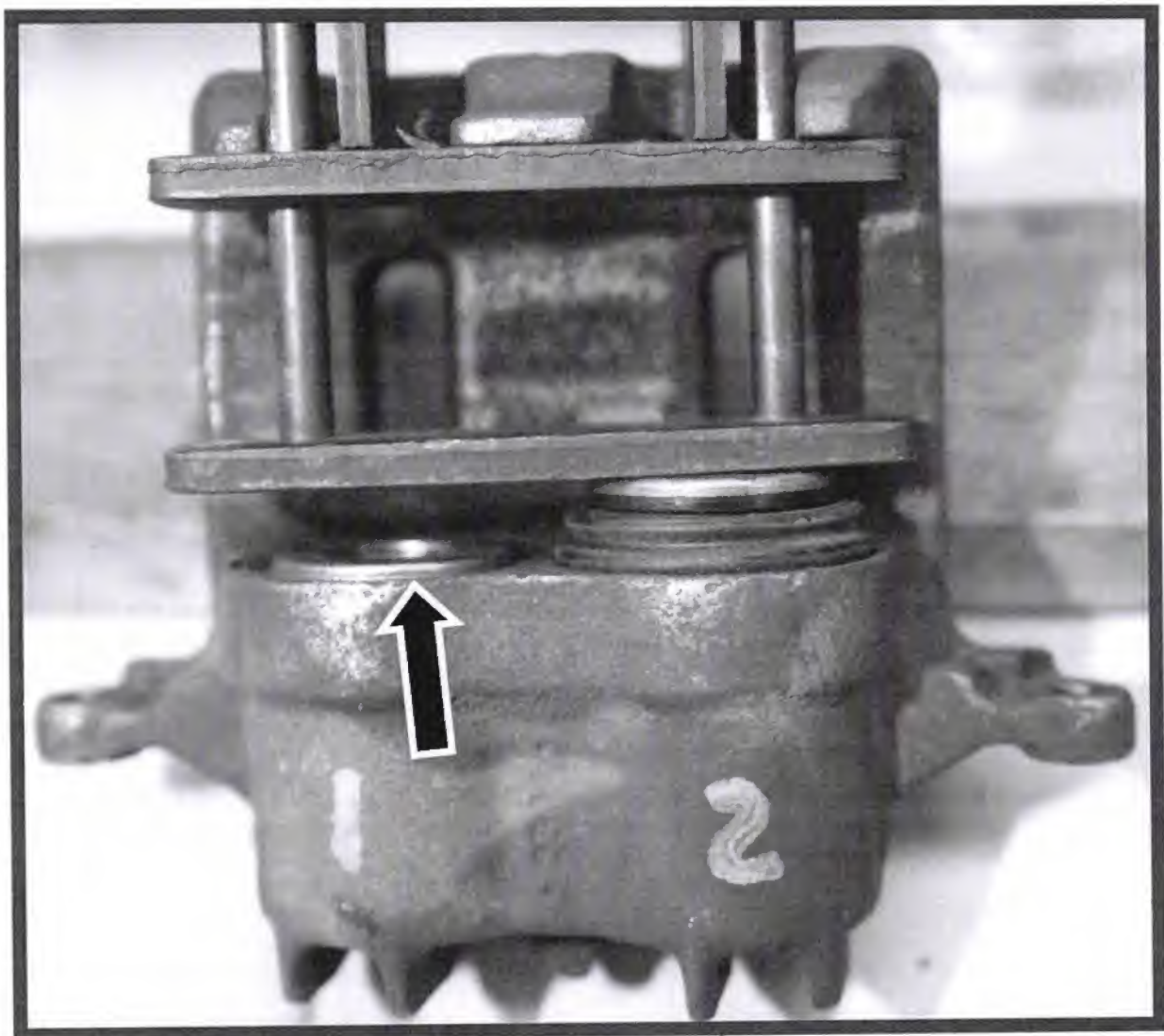


Image No.16. This photograph further depicts the left rear disc brake caliper of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Disassembly procedures revealed that the leading disc brake caliper phenolic piston, designated as Number "1", exhibited binding/partial seizure within its bore, noted within the image by comparing the height of the two pistons in the caliper housing (Black Arrow). This condition would result in reduced brake force at the left rear wheel location of the vehicle during stopping maneuvers.



brake rotor of the 2001 Ford Excursion stretch limousine revealed that of a heavy duty, eight (8) stud hole, cast disc brake rotor. The left rear disc brake rotor is that of vented rotor design, with the friction surfaces consisting of an inner swept area surface, an outer swept area surface, and vanes located between the two surfaces which create air flow for brake system cooling. The examination of the left rear disc brake rotor of the 2001 Ford Excursion stretch limousine revealed heavy corrosion/scaling at the vane areas, resulting in a decrease of the brake system cooling design.

Additional results of the examination of the left rear disc brake rotor of the 2001 Ford Excursion stretch limousine are as follows:

- ✓ No thermal distress noted.
- ✓ Minimal brake dust presence.
- ✓ Outer swept area exhibited corrosion, oxidation, pitting, and scoring.
- ✓ Inner swept area exhibited prominent scoring/excessive wear and delamination, consistent with continual prior metal-to-metal disc brake pad contact from neglect of brake system maintenance; additionally, inner swept area exhibited prevalent corrosion consistent with prolonged absence of braking effort at left rear wheel location.
- ✓ Disc brake rotor was not machined/replaced during brake service conducted by Mavis Discount Tire on May 11, 2018.
- ✓ Minimum measured left rear disc brake rotor thickness = 1.124". Original disc brake rotor thickness = 1.185". Minimum disc brake rotor thickness specification = 1.10". Minimum disc brake rotor thickness to machine rotor specification = 1.12".



- ✓ Park Brake maximum measured diameter = 8.124". Park Brake maximum diameter specification = 8.157".
- ✓ Disc brake rotor swept area measured parallelism = 0.041". Maximum typical parallelism = 0.0005".
- ✓ Disc brake rotor swept area measured lateral runout = 0.020". Maximum typical lateral runout = 0.0008".

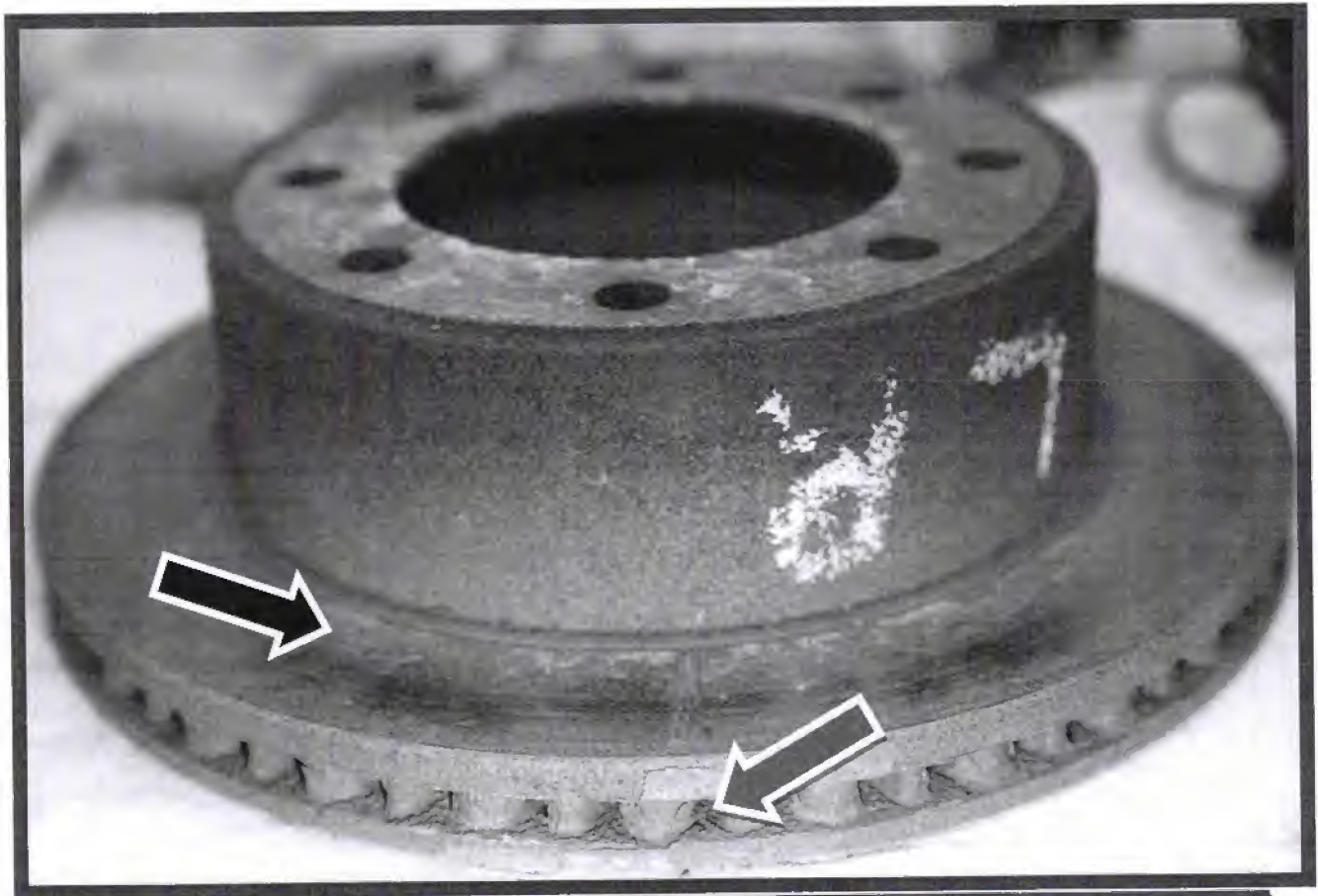


Image No.17. This photograph depicts the left rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Note the heavy corrosion/scaling (Red Arrow) present at the vent vane areas, resulting in a reduction in the effectiveness of the disc brake rotor cooling design. Also note the presence of corrosion at the outer swept area (Black Arrow) -- the area of contact by the outer disc brake pad friction material.

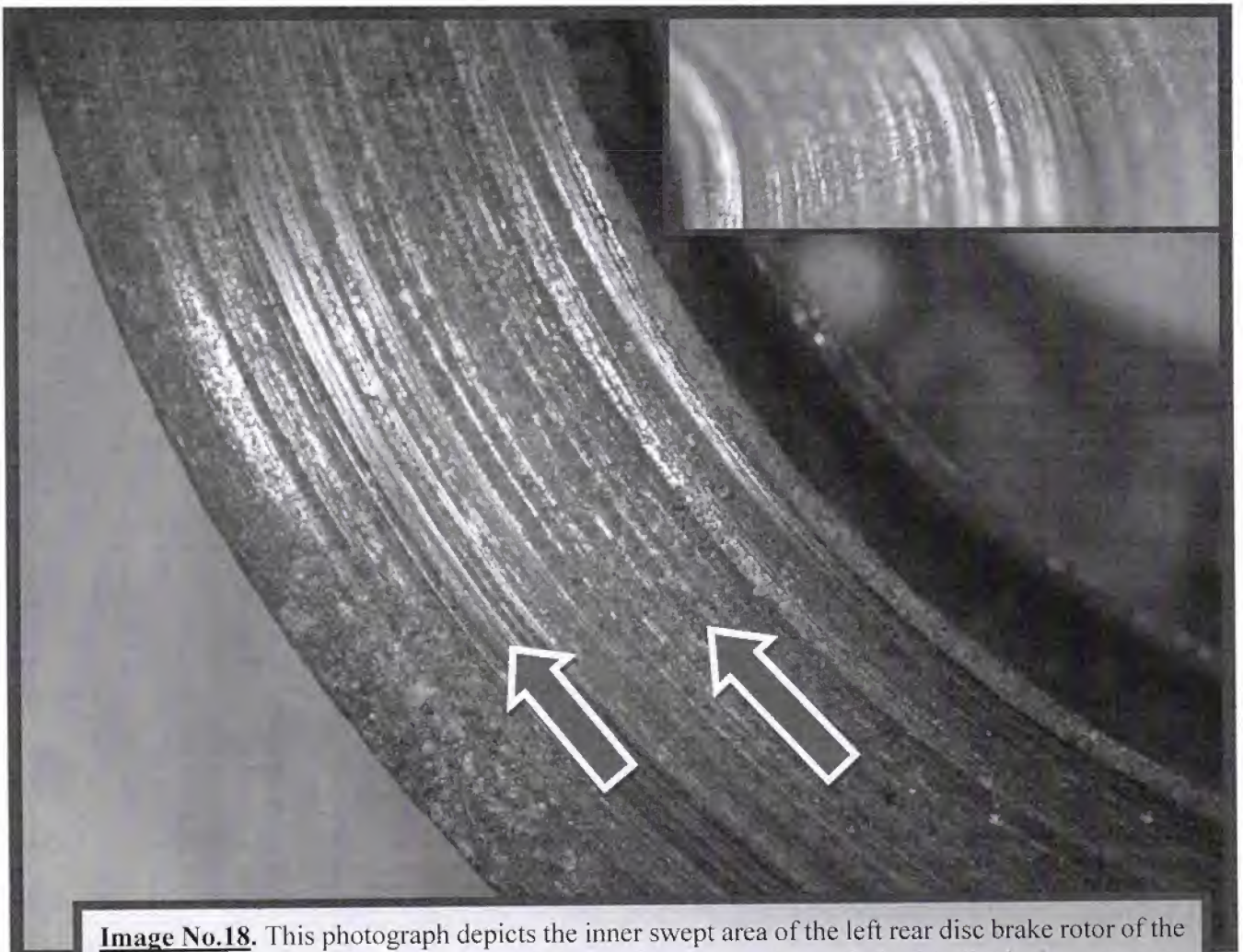


Image No.18. This photograph depicts the inner swept area of the left rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Note the heavy corrosion/scaling and prominent scoring (grooving) present (Red Arrows), consistent with 1)the prolonged operation of vehicle with grossly deteriorated inner brake pad friction material; and 2)ineffective brake effort. Insert photograph depicts the extent of the corrosion/scoring. Photograph below denotes comparison of rotor thickness to that of new rotor.





Images No.19a & 19b. These digital microscope photographs depict the critical state of corrosion/delamination present at the inner swept area of the left rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine (above photograph), as well as the oxidation/corrosion present at the outer disk brake rotor swept area (bottom photograph).



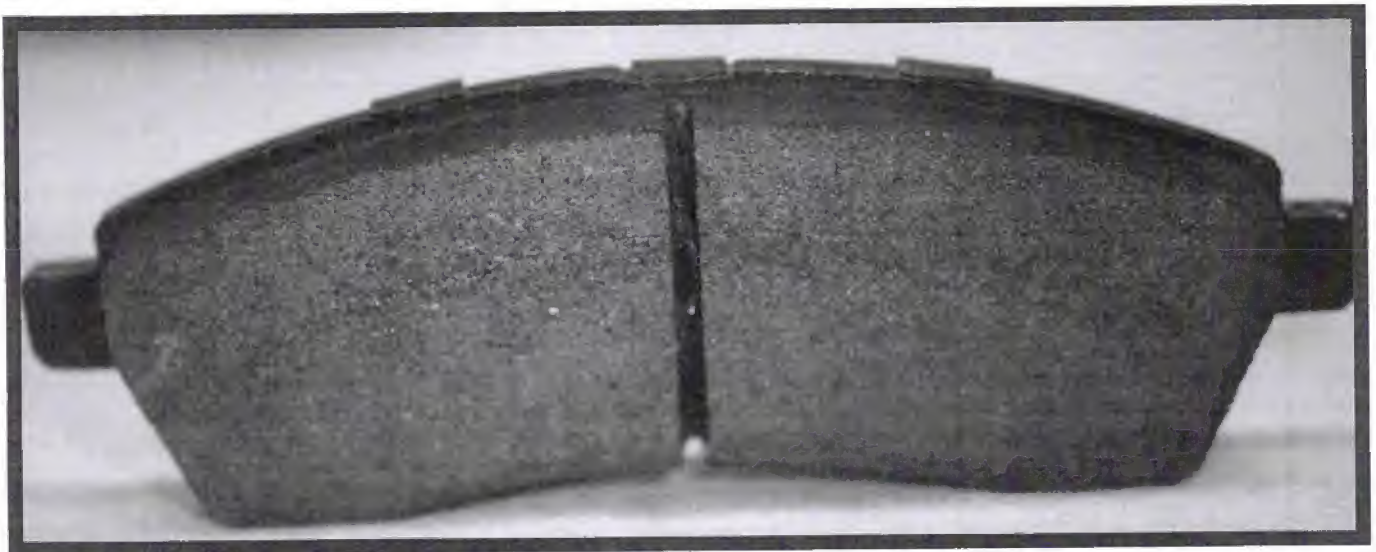


Disc Brake Pads, Left Rear – The examination and forensic analysis of the left rear inner and outer disc brake pads of the involved 2001 Ford Excursion stretch limousine revealed the following:

- ✓ Digital measurements of friction material thicknesses of inner and outer disc brake pads exhibited minimal discrepancies compared to digital measurements of new disc brake pads purchased for comparison, despite replacement by Mavis Discount Tire on May 11, 2018.
- ✓ Bonded design disc brake pads, semi-metallic composition.
- ✓ Brake dust presence nearly nonexistent.
- ✓ No thermal distress noted.
- ✓ Original black steel foundation plate paint clearly evident.
- ✓ Inner disc brake pad friction material exhibited embedded corrosion deposits, with no evidence of scoring wear from severely scored inner left rear disc brake rotor swept area.



Images No.20a & 20b. These photographs depict the outer disc brake pad (above photograph) and inner disc brake pad (bottom photograph) of the involved 2001 Ford Excursion stretch limousine. Note the obvious "as new" appearance inclusive of intact original black paint and absence of inner disc brake pad friction material striations resulting from brake force at scored inner disc brake rotor swept area.





Summary of Forensic Analysis, Left Rear Brake System Components¹²: Pre-existing state was that of operational, albeit with reduced brake effort due to acute corrosion, delamination, and scoring present at disc brake rotor swept area contact locations of disc brake pad friction material. Analysis of wear characteristics of left rear brake components further consistent with reduced hydraulic brake force at left rear wheel location of involved 2001 Ford Excursion stretch limousine. Condition was pre-existing, as supported by the notable absence of obvious brake dust at locations inclusive of the left rear alloy wheel.

¹² Prior to catastrophic failure of rear crossover brake tubing.



BRAKE SYSTEM COMPONENTS, RIGHT REAR

The 2001 Ford Excursion stretch limousine in this case was manufactured by the Ford Motor Company with right rear braking system components inclusive of:

- ✓ Rear Disc Brake Caliper, two piston sliding design.
- ✓ Rear Disc Brake Rotor, vented cast design.
- ✓ Rear Disc Brake Caliper Anchor Plate.
- ✓ Rear Disc Brake Caliper Adapter Plate.
- ✓ Rear Disc Brake Pads.

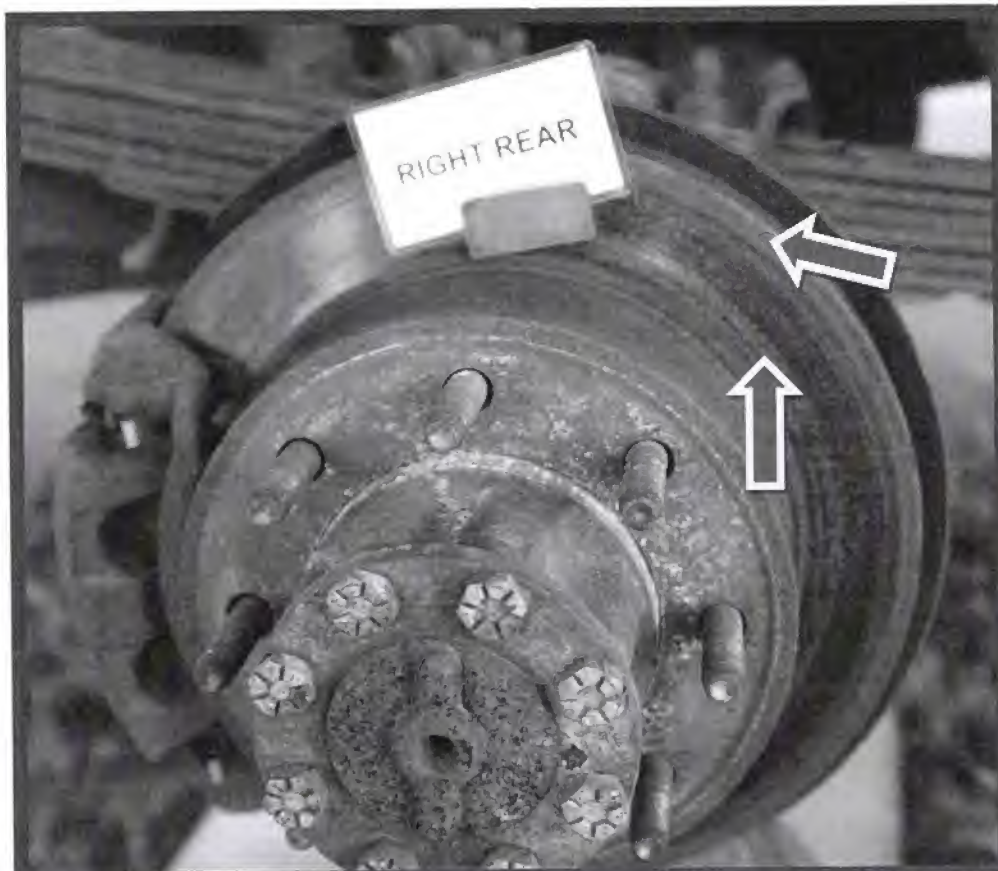


Image No.21. This photograph depicts the right rear disc brake components of the involved 2001 Ford Excursion stretch limousine prior to removal from the vehicle. Note the outer disc brake rotor swept area corrosion, which was a pre-existing condition (Red Arrows).



Disc Brake Caliper, Right Rear – The right rear disc brake caliper of the 2001 Ford Excursion stretch limousine exhibited prominent casting corrosion; corrosion/pitting at the outer disc brake pad flange; and remarkable corrosion at the bleeder valve area. The two brake caliper pistons were seized within the respective caliper housing bores, rendering brake force nonexistent at the right rear wheel location. This condition was pre-existing.

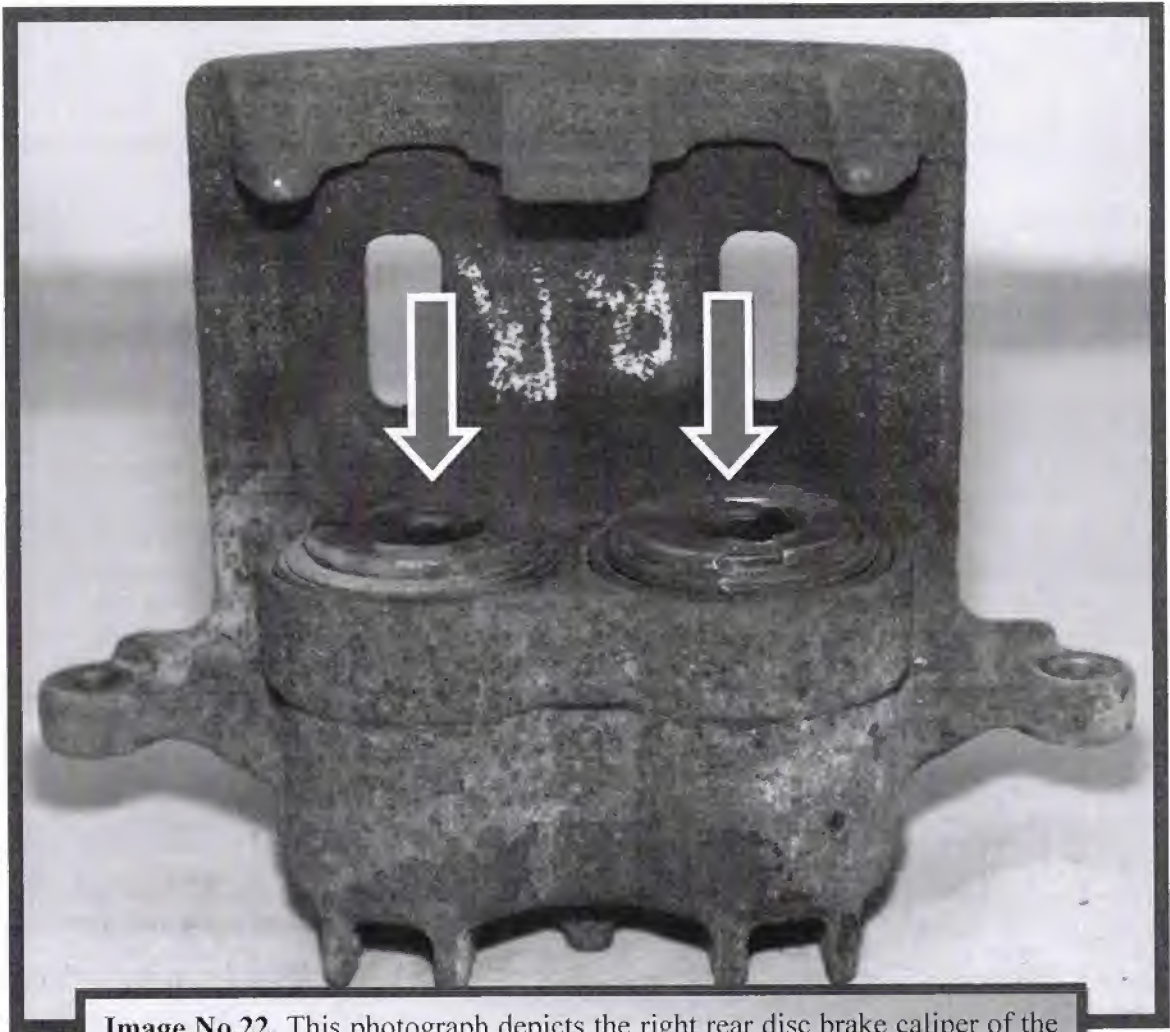


Image No.22. This photograph depicts the right rear disc brake caliper of the involved 2001 Ford Excursion stretch limousine prior to removal from the vehicle. Note the prominent corrosion -- the caliper was that of an older design, with steel composition pistons as opposed to phenolic pistons. The two caliper pistons were seized within their respective bores of the caliper body (Blue Arrows) -- a pre-existing condition.



Disc Brake Rotor, Right Rear – The examination and forensic analysis of the right rear disc brake rotor of the 2001 Ford Excursion stretch limousine revealed that of a heavy duty, eight (8) stud hole, cast disc brake rotor. The right rear disc brake rotor exhibited evidence of pre-existing inoperable brake effort at the right rear wheel location of the 2001 Ford Excursion stretch limousine, including negligible brake friction wear conditions despite alleged 2016 replacement and oxidation/corrosion of inner/outer swept areas.

Additional results of the examination of the right rear disc brake rotor of the 2001 Ford Excursion stretch limousine are as follows:

- ✓ No thermal distress noted.
- ✓ Minimal brake dust presence.
- ✓ Outer swept area exhibited corrosion, oxidation, pitting, and scoring.
- ✓ Inner swept area exhibited corrosion, pitting, and scoring.
- ✓ Condition consistent with deficiencies in effective brake effort.
- ✓ Disc brake rotor was not machined/replaced during brake service conducted by Mavis Discount Tire on May 11, 2018.
- ✓ Minimum measured right rear disc brake rotor thickness = 1.183". Original disc brake rotor thickness = 1.185". Minimum disc brake rotor thickness specification = 1.10". Minimum disc brake rotor thickness to machine rotor specification = 1.12".
- ✓ Reduced brake component cooling due to heavy corrosion at cooling fins.



- ✓ Disc brake rotor thickness measurements revealed merely negligible wear from braking, despite alleged rotor replacement on September 10, 2016¹³.
- ✓ Park Brake maximum measured diameter = 8.104". Park Brake maximum diameter specification = 8.157".
- ✓ Disc brake rotor swept area measured parallelism = 0.010". Maximum typical parallelism = 0.0005".
- ✓ Disc brake rotor swept area measured lateral runout = 0.011". Maximum typical lateral runout = 0.0008".

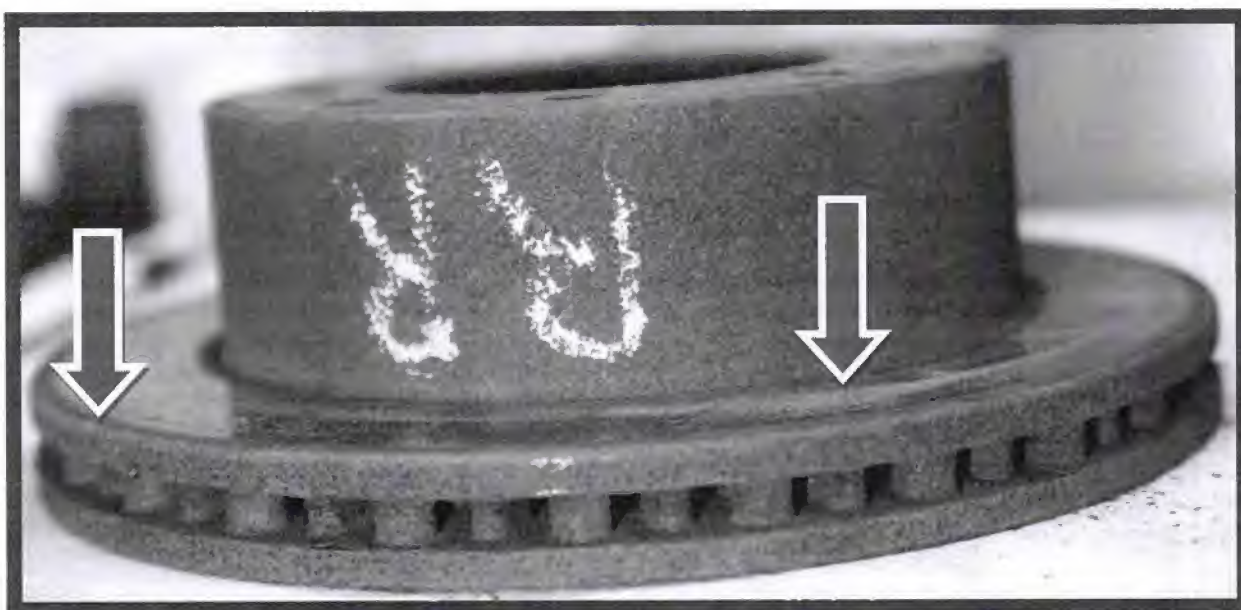


Image No.23. This photograph depicts the right rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Note the oxidation/corrosion present at the outer rotor swept area, as well as absence of wear evidence from braking since replacement in 2016. (Red Arrows), consistent with the previously described condition of pre-existing seized brake caliper pistons which prevented brake application at the right rear wheel location.

¹³ See Invoice Number 741117, Mavis Discount Tire, 09/10/2016.

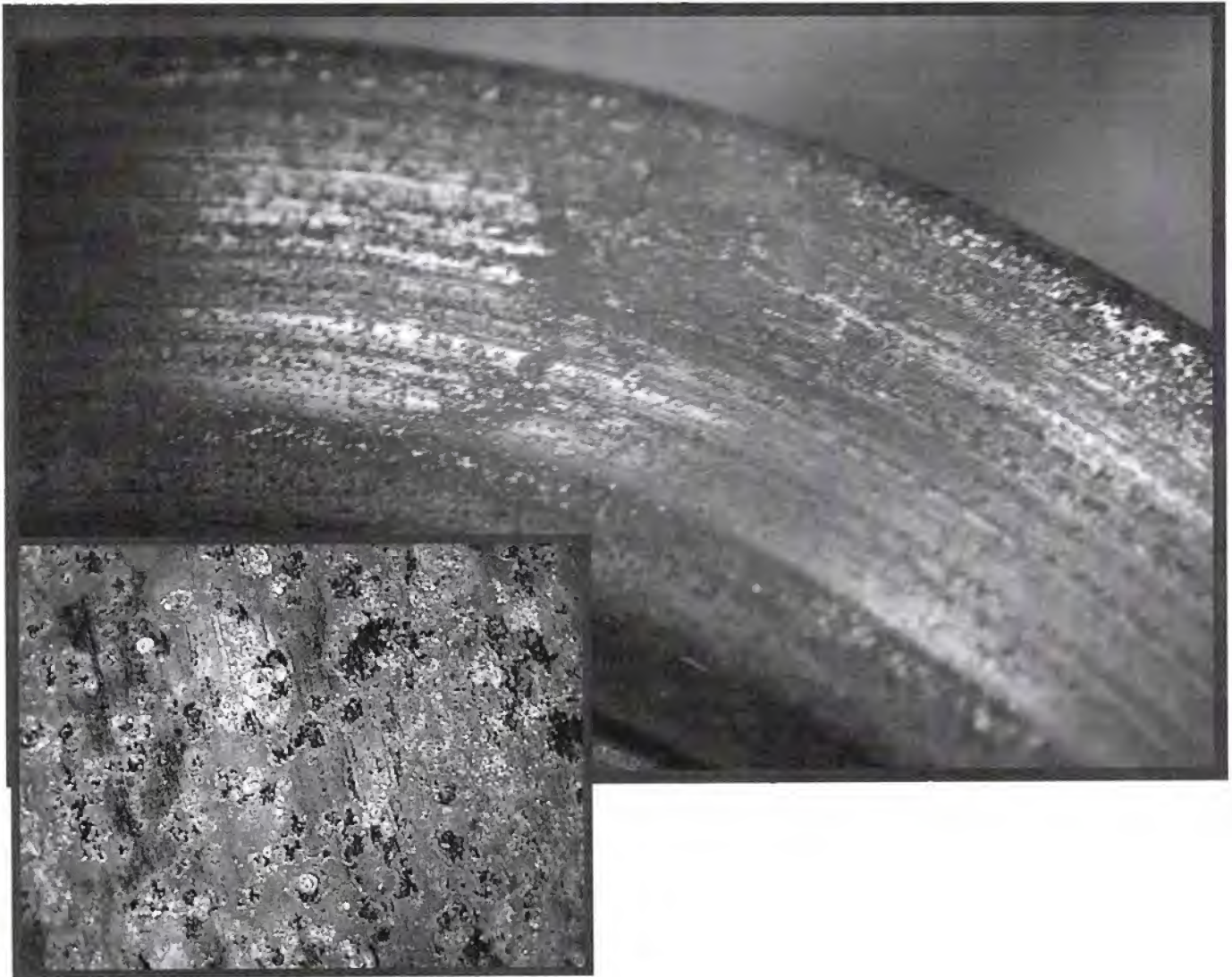


Image No.24. This photograph depicts the inner swept area of the right rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine during the period of individual component analysis. Note the oxidation/corrosion/pitting present within the outer rotor swept area, as well as absence of wear evidence from braking since replacement in 2016, consistent with the previously described condition of pre-existing seized brake caliper pistons which prevented brake application at the right rear wheel location. Insert digital microscope image denotes swept area surface.



Images No.25a & 25b. These photographs depict the comparison of the right rear disc brake rotor of the involved 2001 Ford Excursion stretch limousine to a new replacement disc brake rotor. Note that the removed rotor thickness and lack of wear ridge is consistent with the previously described condition of pre-existing seized brake caliper pistons which prevented brake application at the right rear wheel location.





Disc Brake Pads, Right Rear – The examination and forensic analysis of the right rear inner and outer disc brake pads of the involved 2001 Ford Excursion stretch limousine revealed the following:

- ✓ Digital measurements of friction material thicknesses of outer disc brake pad 0.378" - 0.420", with tapered wear. Original friction material 0.460". Corrosion present at abutment clip locations.
- ✓ Digital measurements of friction material thicknesses of inner disc brake pad 0.338" - 0.394", with tapered wear. Original friction material 0.460". Corrosion present at abutment clip locations.
- ✓ Bonded design disc brake pads, ceramic composition.
- ✓ Brake dust presence minimal, noted at center friction material pad groove due to previous gassing delamination. Superficial friction material contamination.
- ✓ No thermal distress noted.

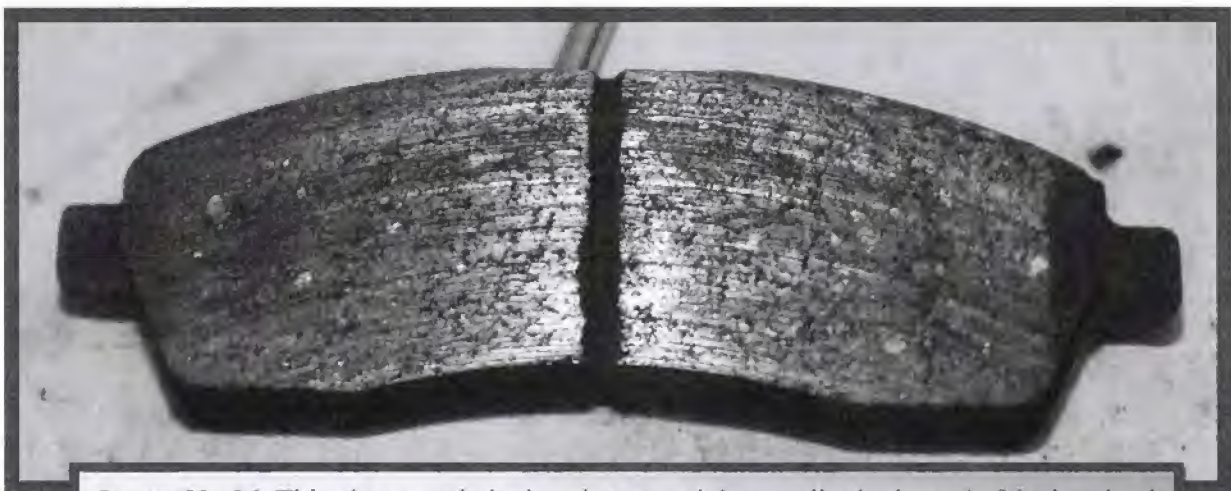


Image No.26. This photograph depicts the outer right rear disc brake pad of the involved 2001 Ford Excursion stretch limousine. The friction material exhibited slight scoring, pitting, and contaminants.



Image No.27. This photograph depicts the inner right rear disc brake pad of the involved 2001 Ford Excursion stretch limousine. Obvious corrosion was present at the inner/outer disc brake pad shim; abutment clip locations; and caliper piston/pad shim interfaces.

Brake Tubing, Right Rear – The examination of the steel composition, rear crossover brake tubing located on the rear differential housing of the involved 2001 Ford Excursion stretch limousine revealed that the section of tubing had experienced failure of integrity, with resulting loss of brake fluid, due to pre-existing critical tubing corrosion. This loss of integrity is typically associated with considerable brake pedal force executed by the operator of the vehicle.

Due to the mandated split service design of the hydraulic braking system of the 2001 Ford Excursion stretch limousine, this loss of integrity at the right rear crossover brake tubing would result in overall brake failure at both left and right rear wheel locations of the vehicle -- braking of the 2001 Ford Excursion stretch limousine would be totally dependent upon the left and right front brake components only.

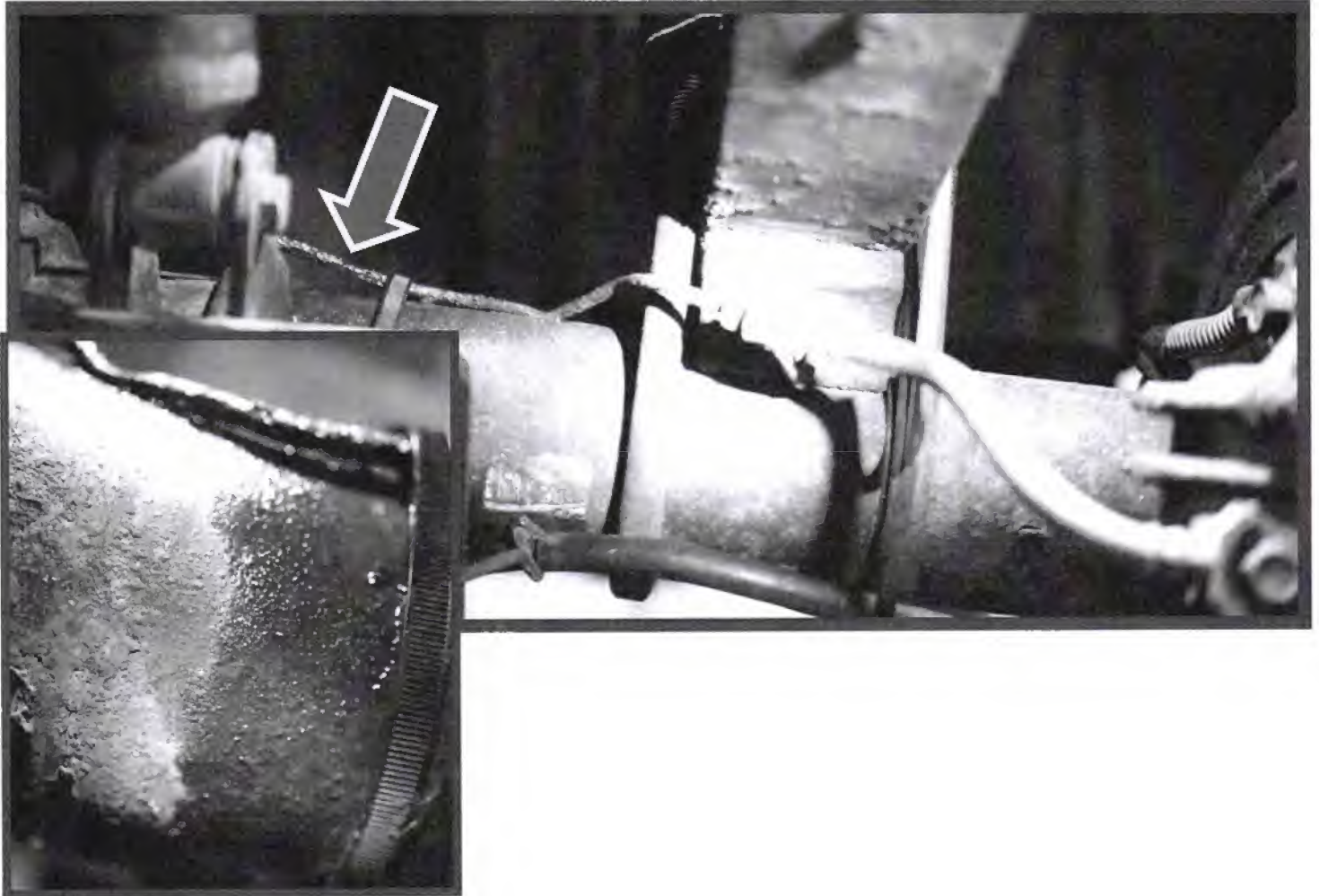
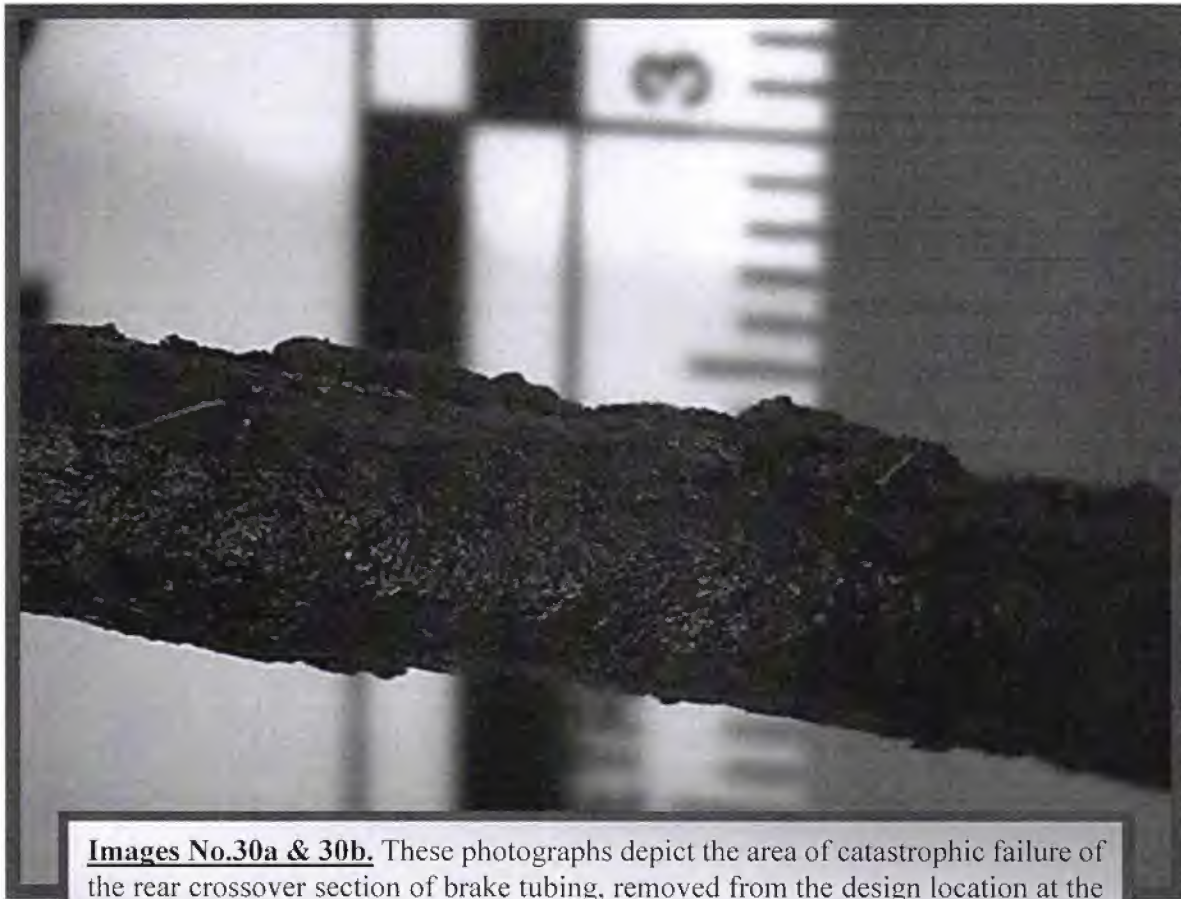


Image No.28. This photograph depicts the rear crossover section of brake tubing, at the right rear differential housing axle tube of the 2001 Ford Excursion stretch limousine. The obvious perilous corrosion of the length of steel composition brake tubing resulted in a catastrophic loss of integrity (Red Arrow), with brake fluid loss clearly discernible from the insert photograph. The loss of integrity resulted in no braking action at the left and right rear wheel locations.



Image No.29. This photograph depicts the rear crossover section of brake tubing, removed from the design location at the right rear differential housing axle tube of the 2001 Ford Excursion stretch limousine. The obvious extent of pre-existing corrosion can be readily denoted, as depicted by the above photograph in the area of the Black Arrow.

The area of the steel composition brake tubing designated as "Crimp" is that of partially collapsed brake tubing, consistent with improper removal of the right rear disc brake caliper of the vehicle.



Images No.30a & 30b. These photographs depict the area of catastrophic failure of the rear crossover section of brake tubing, removed from the design location at the right rear differential housing axle tube of the 2001 Ford Excursion stretch limousine. Again, the obvious extent of pre-existing corrosion can be readily denoted.





Summary of Forensic Analysis, Right Rear Brake System Components: *No braking effort whatsoever in effect at the right rear wheel location of the 2001 Ford Excursion stretch limousine. Condition was pre-existing, as supported by forensic evidence and the absence of obvious brake dust at locations inclusive of the right rear alloy wheel.*

Further, and consistent with harsh brake pedal application by the operator, the rear crossover brake tubing experienced loss of integrity, resulting in a catastrophic loss of braking effort at the left rear wheel location as well.



BRAKE SYSTEM COMPONENTS, LEFT FRONT

The 2001 Ford Excursion stretch limousine in this case was manufactured by the Ford Motor Company with left front braking system components inclusive of:

- ✓ Front Disc Brake Caliper, two piston sliding design.
- ✓ Front Disc Brake Rotor, vented cast design.
- ✓ Front Disc Brake Caliper Anchor Plate.
- ✓ Front Disc Brake Pads.



Image No.30. This photograph depicts the left front disc brake components of the 2001 Ford Excursion stretch limousine. The violent crash forces resulted in abstraction of the outer wheel bearing, washer, and spindle nut. The pungent odor of burnt materials/components was overpowering at the time of examination.



Disc Brake Caliper, Left Front – The left front disc brake caliper of the 2001 Ford Excursion stretch limousine exhibited prominent casting thermal distress with an intense odor of burnt materials/components. The flexible brake hose fitting had been sheared at the casting housing, consistent with impact forces. The two disc brake caliper pistons were of the phenolic composition, presenting proper expansion and seal retraction. The examination of the two piston bores following piston removal revealed slight scoring, slight pitting, and evidence of brake fluid contamination.



Image No.31. This photograph depicts the left front disc brake caliper of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The effects of severe thermal distress were clearly evident, including the intense pungent odor of burnt materials/components.



Disc Brake Rotor, Left Front – The examination and forensic analysis of the left front disc brake rotor of the 2001 Ford Excursion stretch limousine revealed that of a two piece, heavy duty, eight (8) stud hole, cast disc brake rotor. The left front disc brake rotor exhibited prominent evidence of thermal distress, with a remarkable odor of burnt materials/components.

Additional results of the examination of the left front disc brake rotor of the 2001 Ford Excursion stretch limousine are as follows:

- ✓ Outer swept area presented scoring, pitting, corrosion, and embedded brake pad friction material.
- ✓ No brake dust detected due to prior extreme component temperatures.
- ✓ Inner swept area exhibited corrosion, oxidation, pitting, scoring, and embedded brake pad friction material.
- ✓ Condition consistent with extreme thermal distress from brake effort.
- ✓ Rotor vent area exhibited hardened deposits of burnt material.
- ✓ Reduced brake component cooling due to heavy corrosion at cooling fins.
- ✓ Notable scoring, inner bearing race.
- ✓ Minimum measured left front disc brake rotor thickness = 1.502". Minimum disc brake rotor thickness specification = 1.410". Minimum disc brake rotor thickness to machine rotor specification = 1.440".



- ✓ Disc brake rotor swept area measured parallelism = 0.031". Maximum typical parallelism = 0.0005".
- ✓ Disc brake rotor swept area measured lateral runout = 0.010". Maximum typical lateral runout = 0.0008".

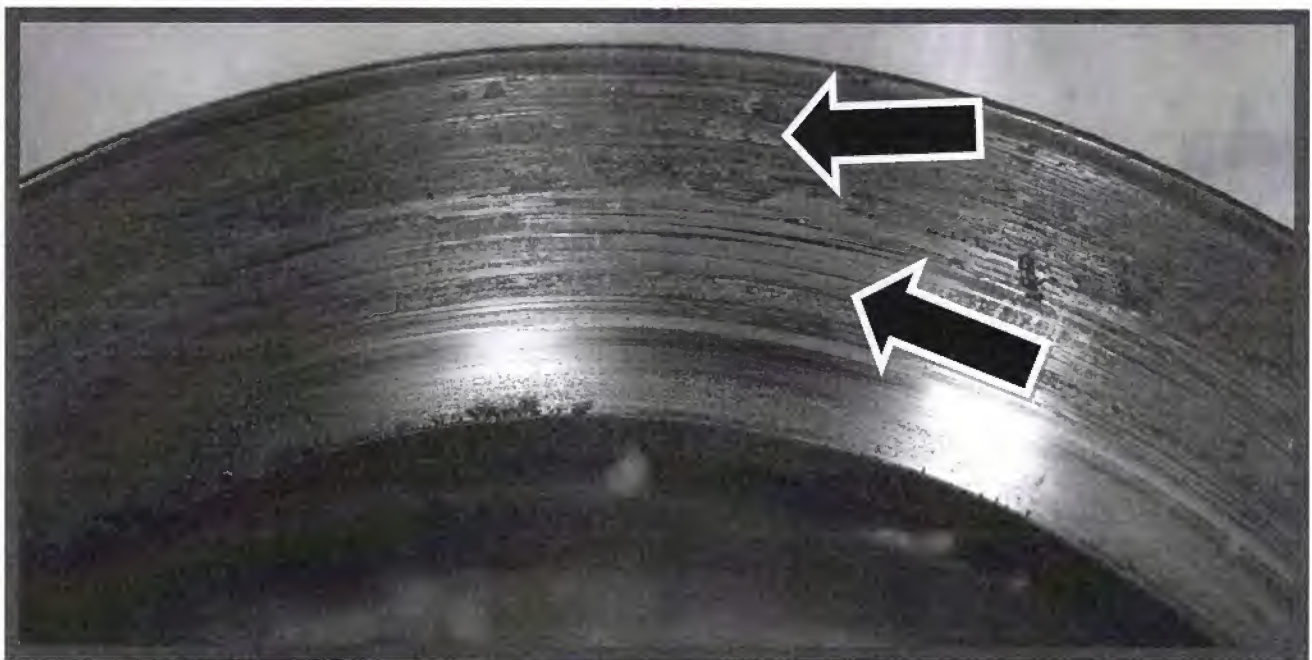


Image No.32. This photograph depicts the outer swept area of the left front disc brake rotor of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The effects of severe thermal distress were clearly evident, including embedded material consistent with thermal deterioration of disc brake pad friction material (Black Arrows).

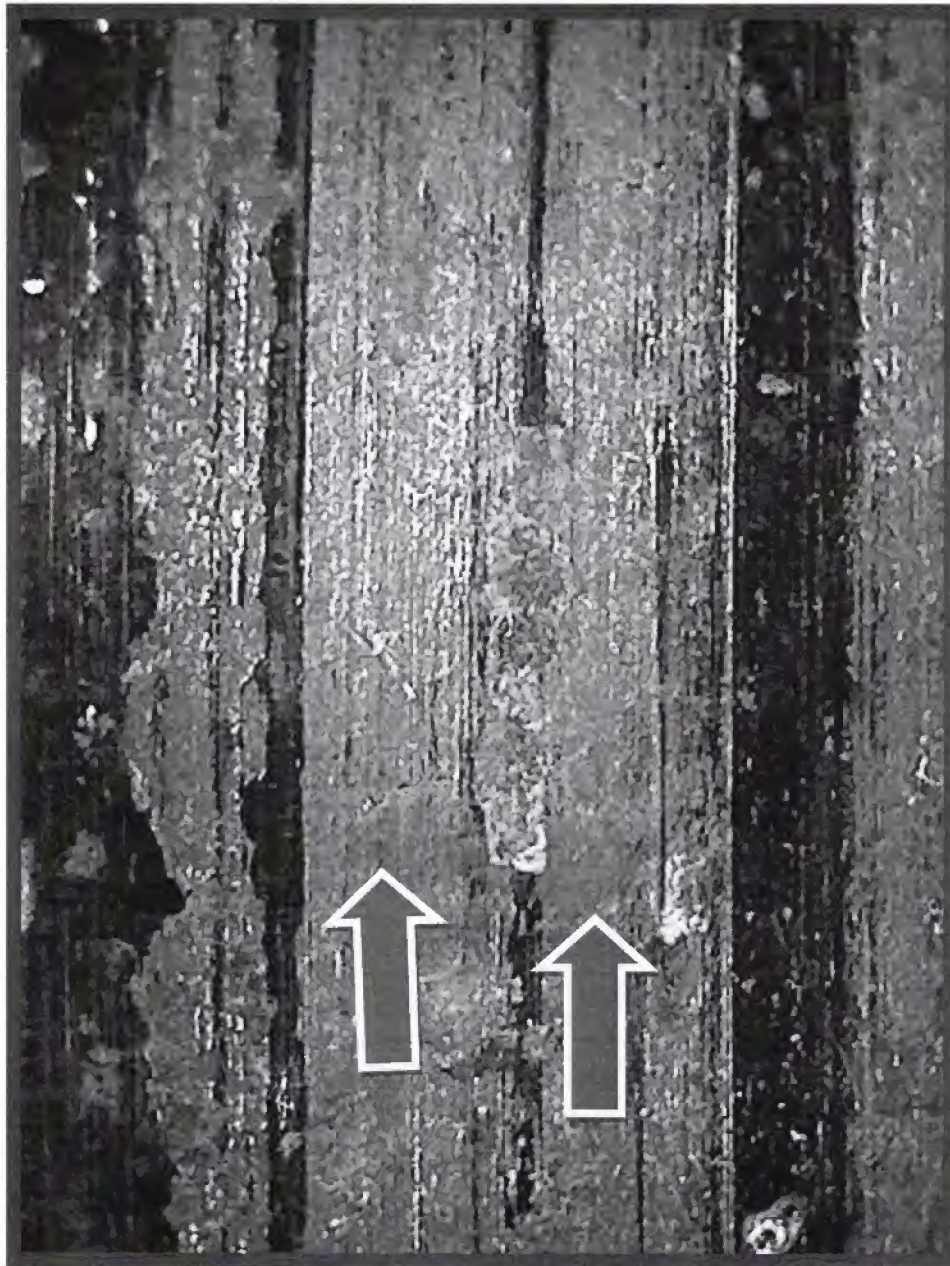
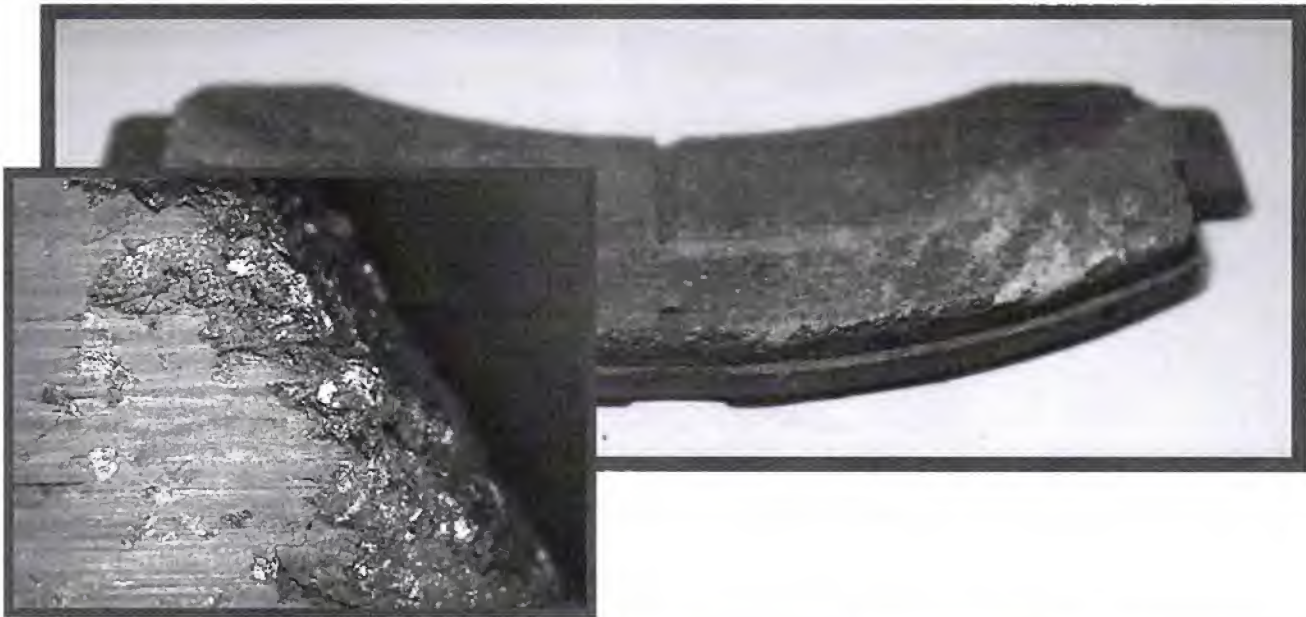


Image No.33. This digital microscope image depicts the inner swept area of the left front disc brake rotor of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The effects of severe thermal distress were clearly evident, including embedded material consistent with thermal deterioration of disc brake pad friction material (Red Arrows).



Disc Brake Pads, Left Front – The examination and forensic analysis of the left front inner and outer disc brake pads of the involved 2001 Ford Excursion stretch limousine revealed the following:

- ✓ Digital measurements of friction material thicknesses of outer disc brake pad 0.248" - 0.312", with tapered wear. Original friction material 0.443". Corrosion present at abutment clip locations.
- ✓ Digital measurements of friction material thicknesses of inner disc brake pad 0.210" - 0.281", with tapered wear. Original friction material 0.443". Corrosion present at abutment clip locations.
- ✓ Bonded design disc brake pads, semi-metallic composition.
- ✓ No brake dust detected due to prior extreme component temperatures.
- ✓ Obvious thermal distress noted, inclusive of embedded glazing deposits and obvious burnt material odor.
- ✓ Inner disc brake pad friction material exhibited embedded glazing deposits and corrosion, with onset of separation and delamination consistent with prior extreme friction temperatures.
- ✓ Outer disc brake pad friction material exhibited embedded glazing deposits, with onset of separation and delamination consistent with prior extreme friction temperatures.



Images No.34a & 34b. These photographs depict the outer disc brake pad friction material (above photograph, with insert) and the inner disc brake pad friction material (below photograph, with insert) of the left front disc brake pads of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The effects of severe thermal distress were clearly evident, including delamination and glazing.





Summary of Analysis, Left Front Brake System Components: *Pre-existing state was that of operational, albeit with reduced brake effort due to condition of disc brake pads and disc brake rotors from neglect of maintenance. Intense thermal distress from overwhelming braking friction resulted in disc brake pad friction material glazing, delamination, and separation. Brake dust accumulation clearly present at left front wheel location.*



BRAKE SYSTEM COMPONENTS, RIGHT FRONT

The 2001 Ford Excursion stretch limousine in this case was manufactured by the Ford Motor Company with right front braking system components inclusive of:

- ✓ Front Disc Brake Caliper, two piston sliding design.
- ✓ Front Disc Brake Rotor, vented cast design.
- ✓ Front Disc Brake Caliper Anchor Plate.
- ✓ Front Disc Brake Pads.



Image No.35. This photograph depicts the right front disc brake components of the 2001 Ford Excursion stretch limousine. The extreme thermal effects were prevalent, inclusive of the pungent odor of burnt materials/components which was overpowering at the time of examination.



Disc Brake Caliper, Right Front – The right front disc brake caliper of the 2001 Ford Excursion stretch limousine also exhibited prominent casting thermal distress, with an intense odor of burnt materials/components. The two disc brake caliper pistons were of the phenolic composition, presenting proper expansion and seal retraction. The examination of the two piston bores following piston removal revealed slight pitting, as well as evidence of brake fluid contamination.

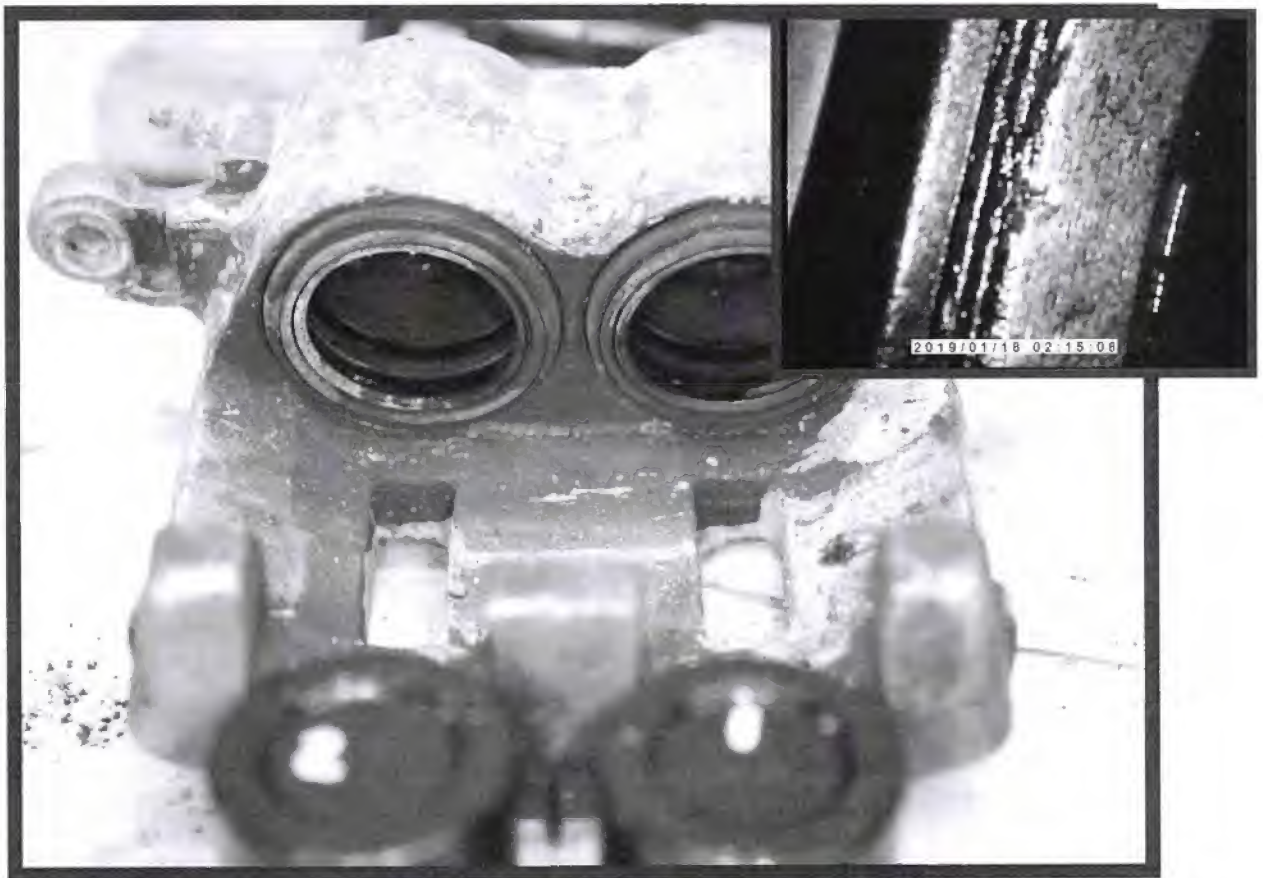


Image No.36. This photograph depicts the right front disc brake caliper of the 2001 Ford Excursion stretch limousine during the period of individual component analysis, following removal of the caliper pistons to allow for examination of the pistons, caliper body bores, and piston seals. As with all front braking system components, the effects of severe thermal distress were clearly evident -- including the intense pungent odor of burnt materials/components.

Digital Bore Scope image insert denotes piston bore gouging in the area of the piston seal.



Disc Brake Rotor, Right Front – The examination and forensic analysis of the right front disc brake rotor of the 2001 Ford Excursion stretch limousine revealed that of a two piece, heavy duty, eight (8) stud hole, cast disc brake rotor. The left front disc brake rotor exhibited readily apparent evidence of thermal distress, with an overpowering odor of burnt materials/components.

Additional results of the examination of the right front disc brake rotor of the 2001 Ford Excursion stretch limousine are as follows:

- ✓ Outer swept area presented scoring, pitting, corrosion, and embedded brake pad friction material.
- ✓ No brake dust detected due to prior extreme component temperatures.
- ✓ Inner swept area exhibited corrosion, pitting, delamination, scoring, and embedded brake pad friction material.
- ✓ Condition consistent with extreme thermal distress from brake effort.
- ✓ Rotor vent area exhibited hardened deposits of burnt material.
- ✓ Reduced brake component cooling due to heavy corrosion at cooling fins.
- ✓ Slight scoring, inner and outer bearing race.
- ✓ Minimum measured left front disc brake rotor thickness = 1.499". Minimum disc brake rotor thickness specification = 1.410". Minimum disc brake rotor thickness to machine rotor specification = 1.440".



- ✓ Disc brake rotor swept area measured parallelism = 0.006". Maximum typical parallelism = 0.0005".
- ✓ Disc brake rotor swept area measured lateral runout = 0.011". Maximum typical lateral runout = 0.0008".

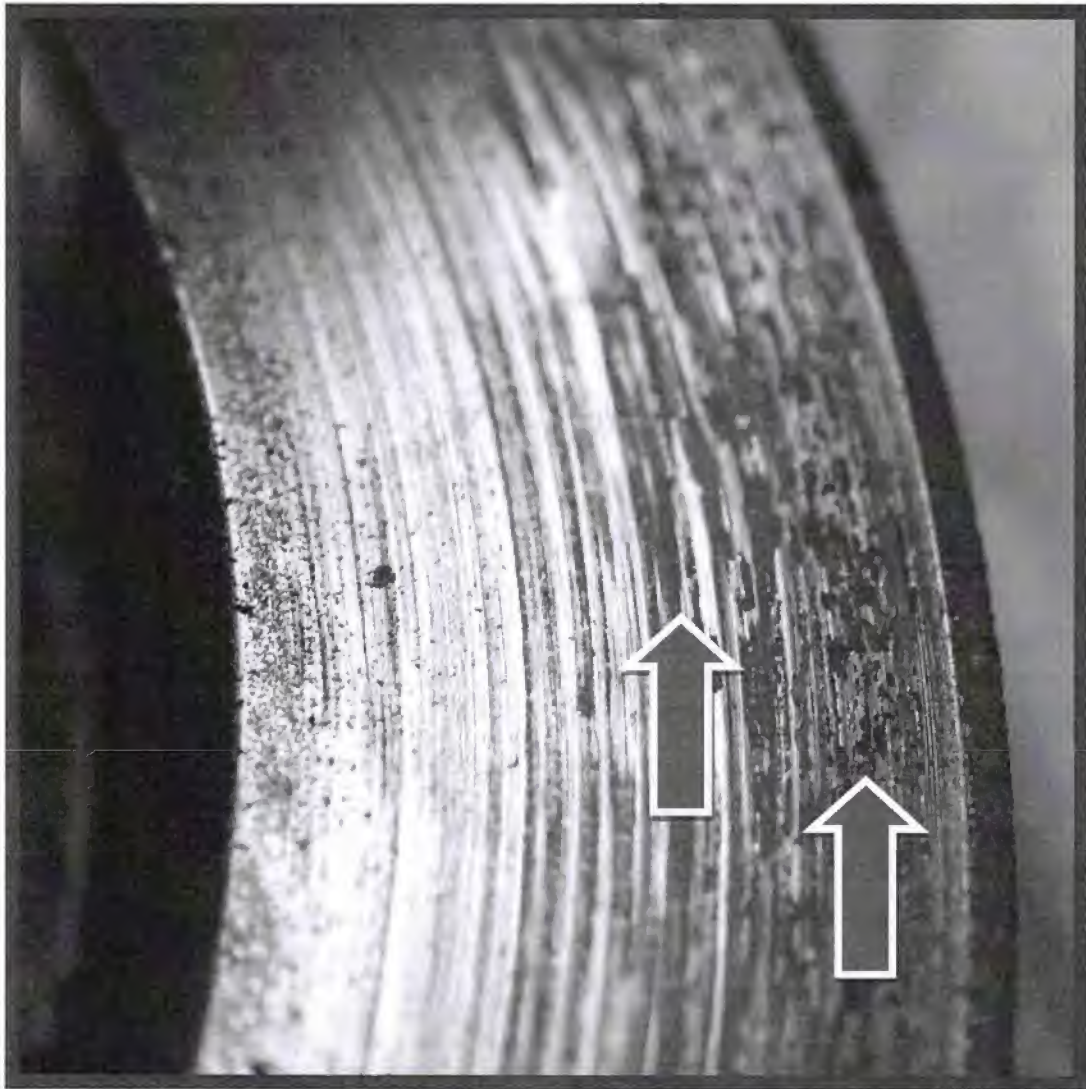


Image No.37. This photograph depicts the outer swept area of the right front disc brake rotor of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. As with all front braking system components, the effects of severe thermal distress were clearly evident, including embedded material consistent with thermal deterioration of disc brake pad friction material during braking (Red Arrows).

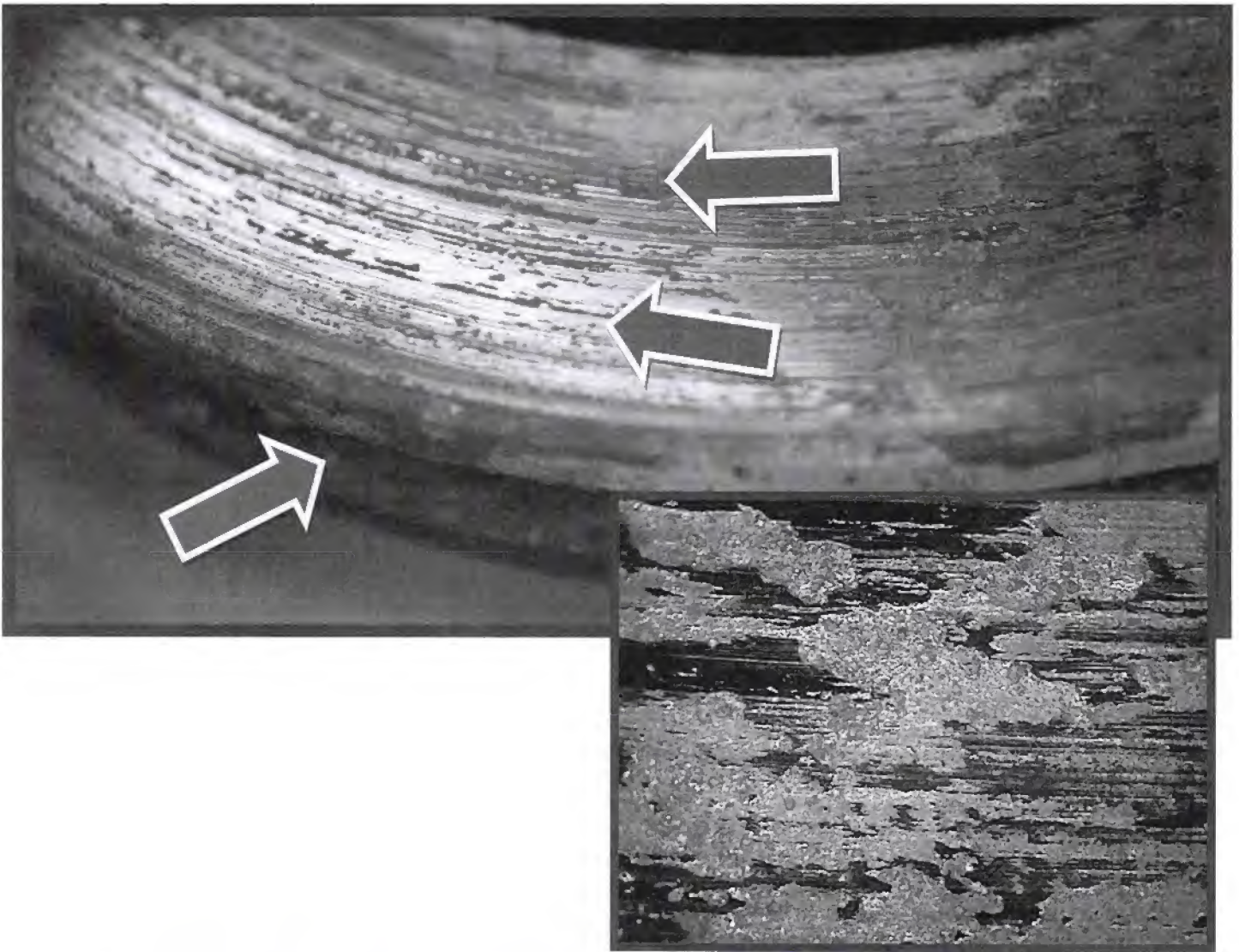
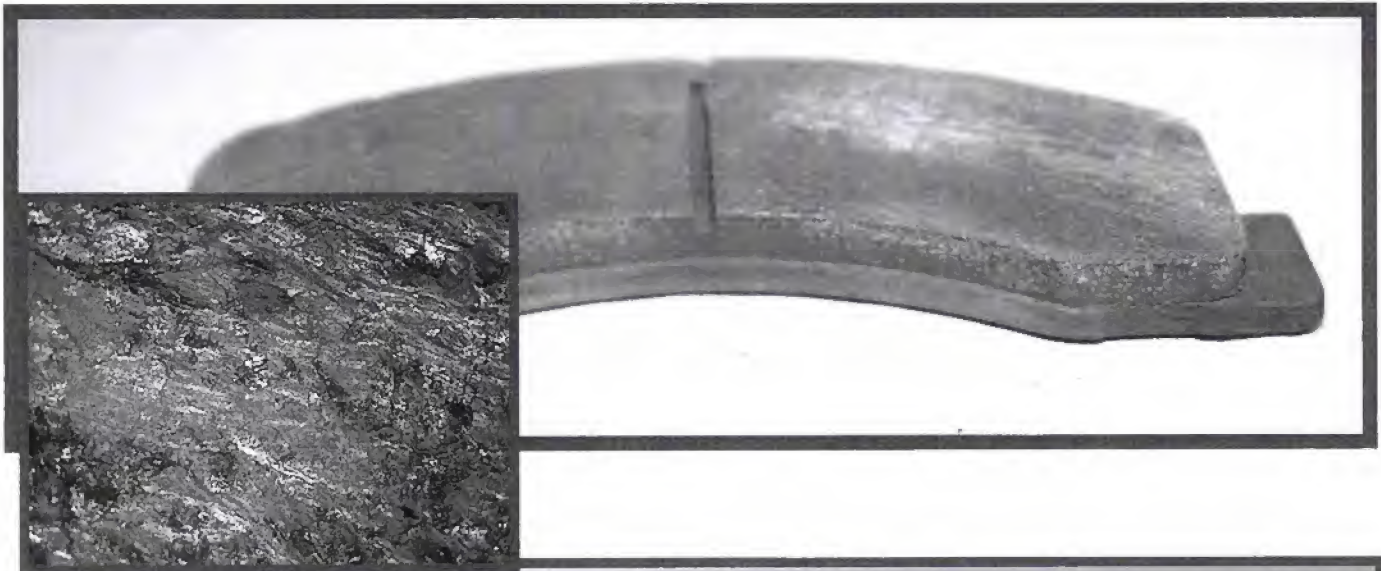


Image No.38. This photograph, with Digital Microscope image insert, depicts the inner swept area of the right front disc brake rotor of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The effects of severe thermal distress from braking were clearly evident - the Red Arrows denote areas of embedded material consistent. The significant corrosion present at the vent area vanes resulted in a reduction in thermal energy transfer (Blue Arrow).

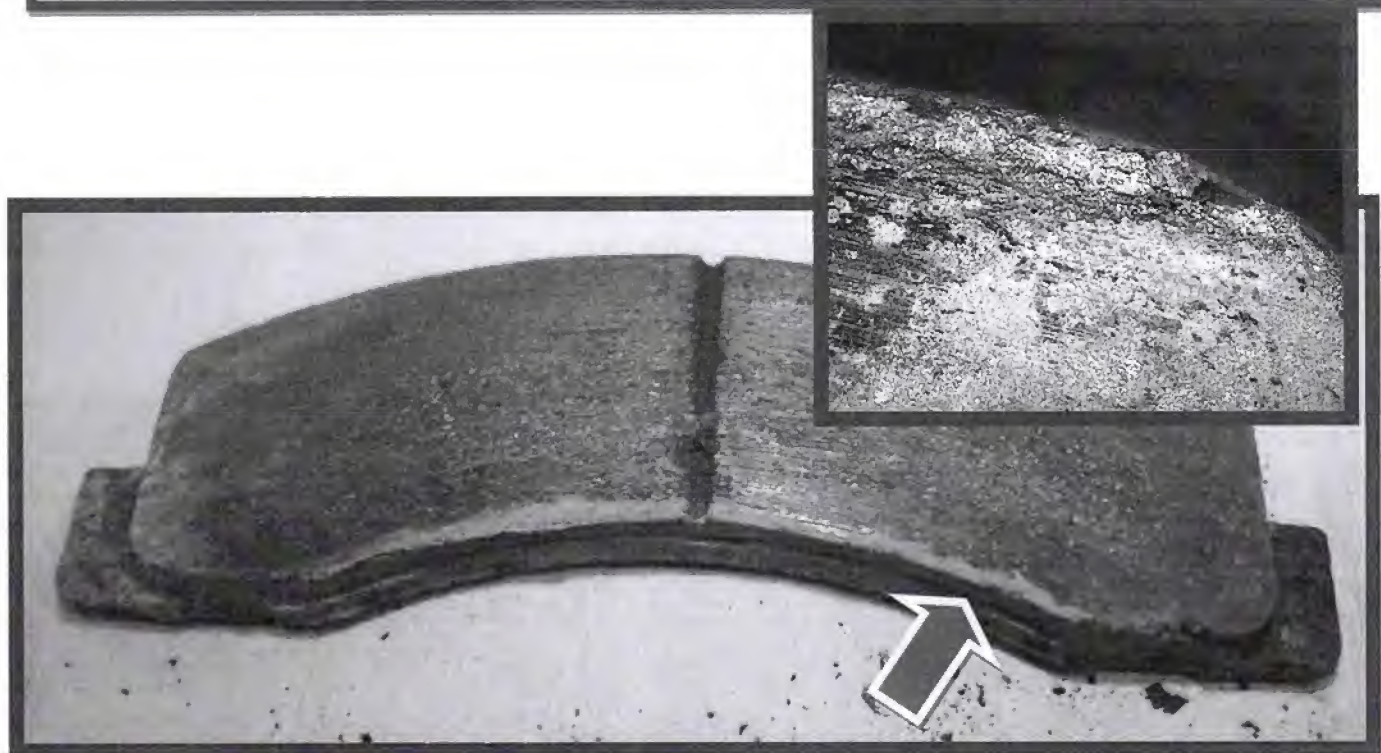


Disc Brake Pads, Right Front – The examination and forensic analysis of the right front inner and outer disc brake pads of the involved 2001 Ford Excursion stretch limousine revealed the following:

- ✓ Digital measurements of friction material thicknesses of outer disc brake pad 0.314" - 0.348". Original friction material 0.443". Corrosion present at abutment clip locations.
- ✓ Digital measurements of friction material thicknesses of inner disc brake pad 0.248" - 0.312", with tapered wear. Original friction material 0.443". Corrosion present at abutment clip locations.
- ✓ Bonded design disc brake pads, semi-metallic composition.
- ✓ No brake dust detected due to prior extreme component temperatures.
- ✓ Obvious thermal distress noted, inclusive of embedded glazing deposits and obvious burnt material odor.
- ✓ Inner disc brake pad friction material exhibited embedded glazing deposits and corrosion, with onset of separation and delamination consistent with prior extreme friction temperatures.
- ✓ Outer disc brake pad friction material exhibited embedded glazing deposits, with onset of separation and delamination consistent with prior extreme friction temperatures.



Images No.39a & 39b. These photographs, with Digital Microscope image inserts, depict the outer disc brake pad friction material (above photographs) and the inner disc brake pad friction material (below photographs) of the right front disc brake pads of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. As with all front braking system components, the effects of severe thermal distress were clearly evident, including delamination and glazing as denoted by the insert photographs. The Red Arrow depicts separation of the bonded friction material from the steel foundation of the disc brake pad, consistent with extreme temperatures from braking.





Wheel Speed Sensor, Right Front – The examination of the right front disc brake components of the involved 2001 Ford Excursion stretch limousine also revealed that the wiring harness which provides communications between the Anti-Lock Brake System Computer Control Module and the Right Front Wheel Speed Sensor was severed, thus rendering the Anti-Lock Braking System of the vehicle inoperative. The analysis of the severed wiring harness disclosed evidence consistent with the damage being that of a pre-existing condition, which would have resulted in illumination of the dash ABS Warning Lamp during vehicle operation.

While this condition is not causal to the multiple fatality crash of October 6, 2018 in Schoharie, New York, it does reflect on the protracted history of neglect of maintenance with respect to the involved 2001 Ford Excursion stretch limousine.

Summary of Analysis, Right Front Brake System Components: *Pre-existing state was that of operational, albeit with reduced brake effort due to condition of disc brake pads and disc brake rotors from neglect of maintenance. Severe thermal distress from overwhelming braking friction resulted in disc brake pad friction material glazing, delamination, and separation. Brake dust accumulation clearly present at right front wheel location.*



BRAKE SYSTEM COMPONENTS -- MASTER CYLINDER

The 2001 Ford Excursion stretch limousine in this case was manufactured by the Ford Motor Company, and was equipped with a split service, tandem master cylinder providing brake fluid pressure to the four wheel braking locations by and through brake pedal force and assisted by a dual diaphragm power brake vacuum brake booster. According to provided documents in this case, the master cylinder was replaced by Mavis Discount Tire on May 11, 2018¹⁴ -- the appearance of the cast master cylinder body at the time of the forensic post-crash analysis was consistent with such replacement.

During the period of specialized forensic analysis of the brake system components removed pursuant to the Search Warrant from the 2001 Ford Excursion stretch limousine, the following highlights were noted with respect to the 1) Dual Diaphragm Power Brake Vacuum Booster; and 2) Brake Master Cylinder.

Image No.40. This photograph depicts the brake master cylinder and the power brake vacuum booster of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The severity of crash impact resulted in 1) separation of the brake master cylinder reservoir; 2) deformation of the front and rear steel brake tubing; and 3) deformation of the power brake vacuum booster housing.



¹⁴ See Invoice Number 758880, Mavis Discount Tire, 05/11/2018.



The disassembly and examination of the power brake vacuum booster of the vehicle revealed that the internal coil spring of the unit was compressed and that the brake master cylinder push rod was extended position.

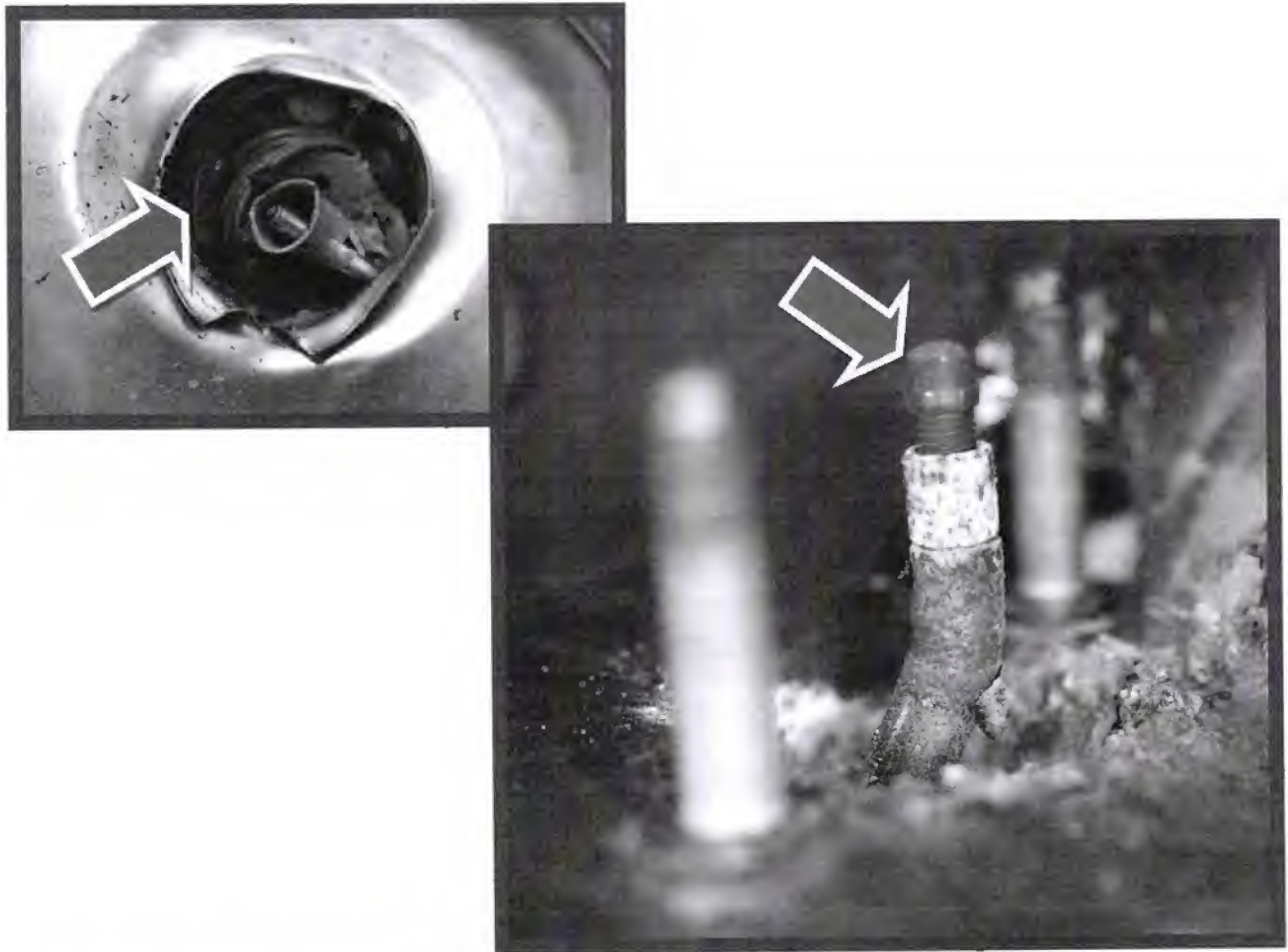


Image No.41a & 41b. These photographs depict the brake master cylinder push rod (lower photograph) and the power brake vacuum booster of the 2001 Ford Excursion stretch limousine during the period of individual component analysis. The state of compression of the internal power brake vacuum booster (Red Arrow), and the extended position of the brake master cylinder push rod of the power brake vacuum booster (Blue Arrow), are consistent with that of brake pedal depression by the vehicle operator at the time of impact, which seized the components in position.



The examination and forensic analysis of the brake master cylinder of the involved 2001 Ford Excursion stretch limousine revealed that the primary piston of the unit was seized in a depressed position within the bore of the brake master cylinder. This condition is consistent with the power brake vacuum booster evidence previously described, and further indicative of operator brake pedal application at the time of impact.



Image No.42. This photograph depicts the brake master cylinder of the 2001 Ford Excursion stretch limousine during the period of individual component analysis (photo right), compared to a new replacement brake master cylinder of the same manufacturer and part number (photo left). The state of seized compression of the primary piston of the involved vehicle brake master cylinder is denoted by the Red Arrow, while the normal spring extended primary piston state is denoted by the Blue Arrow. This post crash condition is further consistent with that of brake pedal depression by the vehicle operator at the time of impact.



Additional Forensic Analysis, Brake Master Cylinder State – As a supplementary investigative segment with respect to the aforementioned forensic evidence consistent with the brake pedal depression of the involved 2001 Ford Excursion stretch limousine at the time of impact, the rubber brake pedal pad was analyzed during the period of individual vehicle component analysis. That analysis, associated with photographs of the shoes worn by the operator of the vehicle at the time of impact, provided evidence further consistent with brake pedal depression by the operator at the time of violent impact.



Image No.43. This photograph depicts the shoes worn by the operator of the 2001 Ford Excursion stretch limousine at the time of the crash on October 6, 2018 in Schoharie, New York. Note that one of the shoes exhibits remarkable deformation at the forward section (Black Arrow), consistent with that section of the foot providing brake pedal depression at impact.

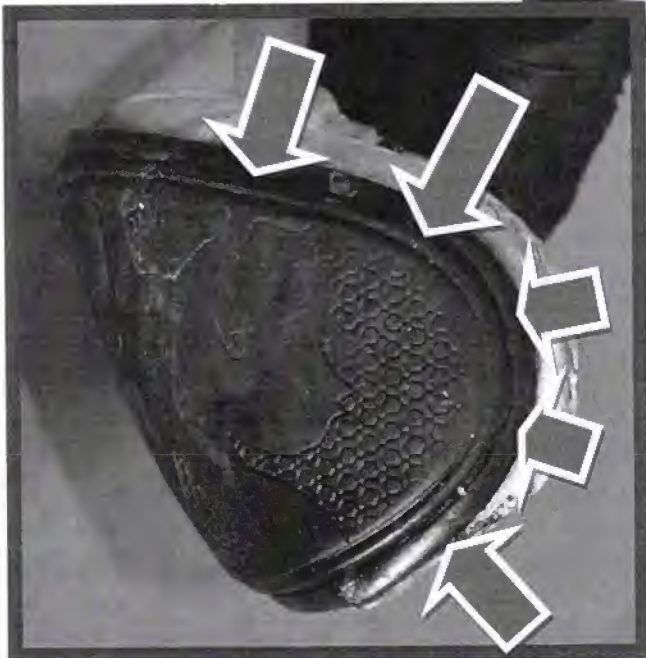
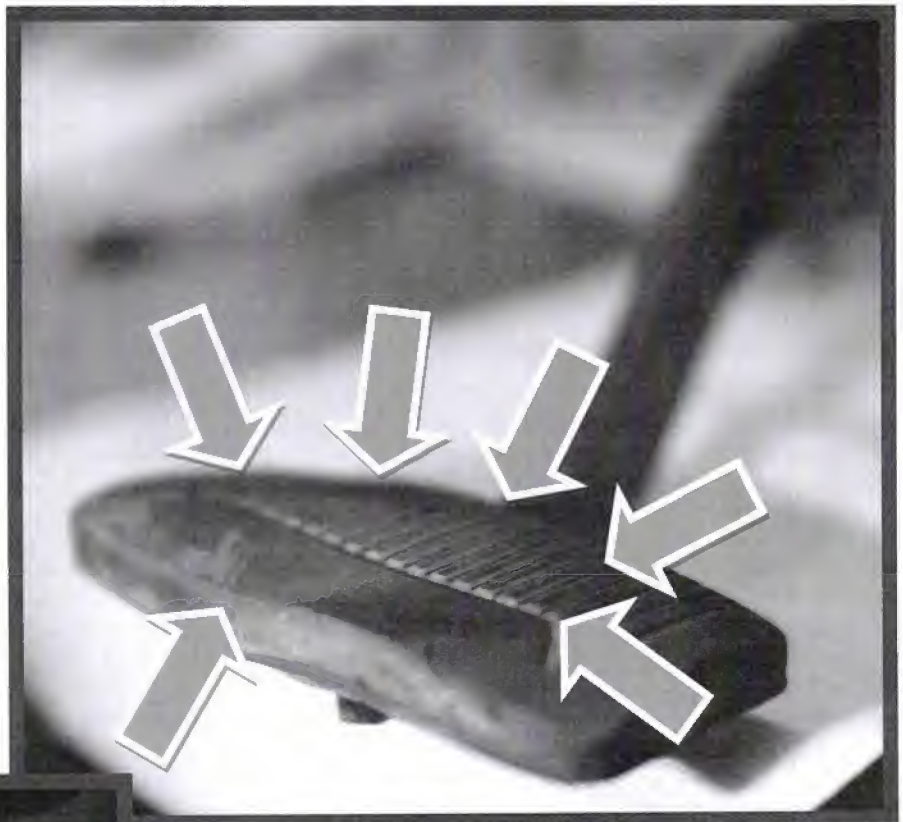


Image No.44a & 44b. These photographs depict the rubber composition brake pedal pad of the 2001 Ford Excursion stretch limousine during the period of individual component analysis (above photograph; and the shoe worn by the operator of the vehicle at the time of impact on October 6, 2018 in Schoharie, New York (left photograph). Note the semi-circular depression imprint of the brake pedal pad (Orange Arrows), which is consistent with the shape of the deformed shoe worn by the operator of the vehicle.



SUMMARY OF ANALYSES OF BRAKE SYSTEM COMPONENTS

The vehicle autopsy and related comprehensive forensic analyses of specific components of the 2001 Ford Excursion stretch limousine has revealed that of prevalent protracted neglect of vehicle maintenance, albeit maintenance specifically mandated with respect to the involved passenger-carrying commercial motor vehicle. Indeed, such neglect of required maintenance was particularly evident during the forensic analyses of the braking system components of the involved vehicle.

In brief summary, the analyses of the brake system components of the 2001 Ford Excursion stretch limousine provided evidence supportive of the conclusion that the commercial motor vehicle was allowed to be operated by limousine company personnel, on October 6, 2018, while laden with seventeen (17) passengers and the driver, with the following pre-existing brake system deficiencies:

- *Brake Inoperable, Right Rear Wheel Location, attributable to pre-existing deficiencies of two seized disc brake caliper pistons.*
- *Reduced Brake Efficiency, Left Rear Wheel Location, attributable to pre-existing deficiencies of disc brake rotor swept area condition, as well as reduced hydraulic brake force.*
- *Reduced Brake Efficiency, Right Front Wheel Location, attributable to pre-existing deficiencies of disc brake rotor swept area condition, as well as disc brake pad friction material condition.*
- *Reduced Brake Efficiency, Left Front Wheel Location, attributable to pre-existing deficiencies of disc brake rotor swept area condition, as well as disc brake pad friction material condition.*



- Severely Corroded Rear Crossover Brake Tubing, ultimately realizing burst failure from brake fluid pressure by and through brake pedal application.

DISCUSSION/METHODOLOGY REGARDING CRASH CAUSATION

1) On October 6, 2018, the 2001 Ford Excursion stretch limousine which is the subject of this forensic analysis and expert report was placed into service by personnel of Prestige Limousine for the purpose of transporting seventeen (17) passengers for compensation. The route of travel for the stretch limousine was inclusive of that of a somewhat easterly trajectory on State Route 7, then negotiating an acute right turn onto State Route 30, and continuing in a somewhat southwesterly direction on State Route 30 to the "T Intersection" of State Route 30A in Schoharie, New York. At a location on State Route 30 just over one (1) mile from the intersection of State Route 30A, the limousine trajectory would realize a notable downhill gradient with maximum slope in excess of six (6) degrees.

2) The 2001 Ford Excursion stretch limousine was placed into service with pre-existing vehicle deficiencies inclusive of a) Inoperable brake at the right rear wheel location; b) Reduced brake efficiency at the left rear wheel location; c) Reduced brake efficiency at the left front wheel location; d) Reduced brake efficiency at the right front wheel location; and e) Heavily corroded steel composition brake tubing at the rear differential location. These deficiencies, which were the result of sheer neglect of proper and mandated vehicle inspection and maintenance procedures, resulted in significantly reduced overall brake system efficiency. Simply stated, the pre-existing deficiencies of the brake system components of the 2001 Ford Excursion stretch limousine created a condition of inadequate slowing/stopping ability of the vehicle, in noncompliance with Federal Motor Vehicle Safety Standards as cited by and through 49CFR571.105.



3) Brake configuration calculations established that the brake system component design at the time of manufacture by the Ford Motor Company exceeded requirements set forth by applicable Federal Motor Vehicle Safety Standards¹⁵. Moreover, brake configuration calculations further revealed that the original manufactured brake system component design also exceeded requirements of applicable Federal Motor Safety Standards¹⁶ at the time of alteration of the manufactured Ford Excursion to that of the stretch limousine. Simply stated, the designed brake system of the 2001 Ford Excursion was indeed adequate and capable of properly slowing/stopping the vehicle -- had the brake system components undergone requisite routine and systematic inspection and maintenance. Indeed, this was a seventeen (17) year old vehicle with over 200,000 miles -- with no history prior to this owner of braking maladies.

4) Consistent with the notable weight of the vehicle; the remarkable duration/negative gradient of the roadway; the pre-existing vehicle brake system deficiencies; physical evidence¹⁷; as well as established factors resulting in corroded brake tubing burst failure, the operator of the 2001 Ford Excursion stretch limousine initiated a forceful brake pedal application during attempts to decelerate the vehicle, resulting in burst failure of the rear crossover brake tubing due to the extent of corrosion. Upon burst failure of the rear crossover brake tubing, slowing/stopping/braking of the 2001 Ford Excursion stretch limousine would rely solely upon the left and right front braking system components.¹⁸

5) Due to the continued gravitational acceleration of the vehicle and resulting remarkable level of kinetic energy of the 2001 Ford Excursion stretch limousine descending the lengthy, steep roadway gradient of State Route 30, the now exclusive operational brake system components

¹⁵ See 49CFR571.105.

¹⁶ *Id.*

¹⁷ Physical evidence is inclusive of no detected brake fluid puddling at locations where the limousine had slowed/stopped along the route, as well as the remaining quantity of brake fluid present within the rear hydraulic system over days following the crash.

¹⁸ As designed at the time of vehicle manufacture by the Ford Motor Company pursuant to Federal Motor Vehicle Safety Standard 49CFR571.105, the hydraulic brake system of the vehicle is that of a split service design.



located at the left front wheel and right front wheel locations of the vehicle would have proven inadequate in both brake efficiency and thermal energy transfer attributes. Simply stated, the extreme heat generated from friction of the now inadequate operational brake system components would have resulted in initial brake fade (the notable reduction in vehicle deceleration from braking), and ultimately that of catastrophic brake system failure due to the boiling of the brake fluid. Due to aeration of the brake fluid, and subsequent resulting loss of a basic principal of hydraulics that fluid cannot be compressed, the operator of the 2001 Ford Excursion stretch limousine would then realize the brake pedal travel to the floor of the vehicle.



FEDERAL MOTOR CARRIER SAFETY REGULATIONS¹⁹

The Federal Motor Carrier Safety Regulations are federal administrative rules which are specifically applicable to the operation of commercial motor vehicles, and are adopted by reference by and through state statutory language. These provisions mandate specific requirements which must be met by the company owners, company supervisors, company personnel, and operators of commercial motor vehicles, inclusive of the requisite systematic and proper inspection and maintenance of the commercial motor vehicle.

1) Applicability of the FMCSR's, Generally.

Specific to this case, the Federal Motor Carrier Safety Regulations "*are applicable to all employers, employees, and commercial motor vehicles that transport property or passengers. . .*" (See 49CFR390.3(a))

The term "Commercial Motor Vehicle" means any self-propelled vehicle which "(1) Has a gross vehicle weight rating of 10,001 pounds or more; or (2) Is designed or used to transport more than 8 passengers (including the driver) for compensation." (See 49CFR390.5)

(Discussion -- the involved 2001 Ford Excursion stretch limousine carrying seventeen (17) passengers and the driver for compensation, with a weight exceeding 10,000 lbs., was, in fact, that of a "Commercial Motor Vehicle".)

The term "Motor Carrier" means "*a for-hire motor carrier or a private motor carrier. The term includes a motor carrier's agents, officers and representatives as well as employees responsible for hiring, supervising, training, assigning, or dispatching of drivers and employees concerned with the installation, inspection, and maintenance of motor vehicle equipment and/or accessories.*" (See 49CFR390.5)

¹⁹ See Addendum A.



2) Knowledge and Compliance with the Regulations.

"Every employer shall be knowledgeable of and comply with all regulations contained in this subchapter that are applicable to that motor carrier's operations." (See 49CFR390.3(e))

"Every driver and employee involved in motor carrier operations shall be instructed regarding, and shall comply with, all applicable regulations contained in this subchapter." (49CFR390.3(e)(2)).

3) Inspection, Repair, and Maintenance, Regulations.

"Every motor carrier, its officers, drivers, agents, representatives, and employees directly concerned with the inspection or maintenance of commercial motor vehicles must be knowledgeable of and comply with the rules of this part." (See 49CFR396.1(a))

"Every motor carrier and intermodal equipment provider must systematically inspect, repair, and maintain, or cause to be systematically inspected, repaired, and maintained, all motor vehicles and intermodal equipment subject to its control." (See 49CFR396.3(a))

"Parts and accessories shall be in safe and proper operating condition at all times. These include those specified in part 393 of this subchapter and any additional parts and accessories which may affect safety of operation, including but not limited to, frame and frame assemblies, suspension systems, axles and attaching parts, wheels and rims, and steering systems." (See 49CFR396.3(a)(1))

"A motor vehicle shall not be operated in such a condition as to likely cause an accident or a breakdown of the vehicle." (See 49CFR396.7)

"Every motor carrier shall require its drivers to report, and every driver shall prepare a report in writing at the completion of each day's work on each vehicle operated, except for intermodal equipment tendered by an intermodal equipment provider. The report shall cover at least the following parts and accessories:

(i) Service brakes..." (See 49CFR396.11(a))



4) Parts and Accessories Necessary for Safe Operation, Regulations.

"Every motor carrier and its employees must be knowledgeable of and comply with the requirements and specifications of this part." (See 49CFR393.1(b)(1))

"No motor carrier may operate a commercial motor vehicle, or cause or permit such vehicle to be operated, unless it is equipped in accordance with the requirements and specifications of this part." (See 49CFR393.1(b)(1))

"No motor carrier may operate a commercial motor vehicle, or cause or permit such vehicle to be operated, unless it is equipped in accordance with the requirements and specifications of this part." (See 49CFR393.1(c))

"Each commercial motor vehicle must have brakes adequate to stop and hold the vehicle or combination of motor vehicles. Each commercial motor vehicle must meet the applicable service, parking, and emergency brake system requirements provided in this section." (See 49CFR393.40(a))

"Motor vehicles equipped with hydraulic brake systems and manufactured on or after September 2, 1983, must, at a minimum, have a service brake system that meets the requirements of FMVSS No. 105 in effect on the date of manufacture. Motor vehicles which were not subject to FMVSS No. 105 on the date of manufacture must have a service brake system that meets the applicable requirements of §§393.42, 393.48, 393.49, 393.51, and 393.52 of this subpart." (See 49CFR393.40(b))

"Every commercial motor vehicle shall be equipped with brakes acting on all wheels." (See 49CFR393.42)

"Except as provided in paragraphs (b), (c), and (d) of this section, all brakes with which a motor vehicle is equipped must at all times be capable of operating." (See 49CFR393.48)

"Upon application of its service brakes, a motor vehicle or combination of motor vehicles must under any condition of loading in which it is found on a public highway, be capable of—



(1) Developing a braking force at least equal to the percentage of its gross weight specified in the table in paragraph (d) of this section;" (See 49CFR393.52)

4) Driving of Commercial Motor Vehicles, Regulations.

"Every motor carrier, its officers, agents, representatives, and employees responsible for the management, maintenance, operation, or driving of commercial motor vehicles, or the hiring, supervising, training, assigning, or dispatching of drivers, shall be instructed in and comply with the rules in this part." (See 49CFR392.1(a))

"No commercial motor vehicle shall be driven unless the driver is satisfied that the following parts and accessories are in good working order, nor shall any driver fail to use or make use of such parts and accessories when and as needed: Service brakes...." (See 49CFR392.7(a))

CVSA OUT-OF-SERVICE CRITERIA

The Commercial Vehicle Safety Alliance (CVSA) establishes regulations for the operation of commercial motor vehicles known as "Out-of-Service Criteria". This criteria, based upon Federal Motor Carrier Safety Regulations, sets forth egregious safety conditions of which a commercial motor vehicle is not allowed to be operated.

In this case, the pre-existing condition of the inoperable brake at the right rear wheel location specifically fell within the purview of the Out-of-Service Criteria set forth by the Commercial Vehicle Safety Alliance. Simply stated, and based solely on the one noted braking deficiency, the 2001 Ford Excursion stretch limousine which experienced catastrophic brake failure on October 6, 2018 resulting in the loss of twenty (20) lives, should have not been allowed to have been operated on the public ways of the state of New York.



INSPECTION OF ADDITIONAL PRESTIGE LIMOUSINES

On February 6th and February 7th, 2019, three (3) additional stretch limousines owned/operated by Prestige Limousine were the subject of safety inspections to determine potential existing component deficiencies. Highlights of the inspections are as follows:

1) 2008 Lincoln Town Car Stretch Limousine, VIN -- 2L1FM88W18X646096²⁰

- Abnormal tire wear.
- Right Front Tire exceeds manufacturer age limit.
- Right Front Tire near minimum tread depth requirement.
- Right Rear Tire tread depth less than 1/32".
- Right Rear Tire/Wheel missing TPMS Sensor/TPMS dash light illumination.
- Right Rear Tire weather cracking.
- Right Rear Tire improperly repaired by plug.
- Left Rear Tire tread depth less than 2/32".
- Brake System Components.
 - Tapered wear, friction material.
 - Delamination, friction material.
 - Glazing and scoring, friction material.
 - Caliper slides sticking.
 - Caliper pistons binding in bores.
- Electrical short circuit, resulting in smoke.
- Headlamp lenses hazed, reduction in luminous intensity.
- Extensive rust-through, left inner rocker panel front-to-rear.
- Extremely low engine oil level -- not showing on dipstick.
- Power steering fluid level minimum.
- Brake fluid level low. Fluid contaminated.
- Engine coolant level low.
- Unsecured battery.

²⁰ See Addendum C.



- Audible exhaust leak, right side engine manifold.
- Extensive corrosion of steel brake tubing, front-to-rear.

2) 2008 Lincoln Town Car Stretch Limousine, VIN -- 2L1FM88W38X646102²¹

- Right Front Tire tread depth marginal.
- Left Rear Tire tread depth marginal.
- Right Rear Tire tread depth marginal. Shoulder wear. Abnormal wear.
- TPMS dash light illumination.
- Left Front Tire/Wheel missing TPMS Sensor.
- Left Rear Tire/Wheel missing TPMS Sensor.
- Right Headlamp lens hazed, reduction in luminous intensity.
- Third brake lamp inoperative.
- Worn hinge pins/bushings, left front door.
- Extensive corrosion and rust-through, floor pan areas.
- Extensive corrosion and rust-through, left and right inner rocker panels.
- Power steering fluid, burnt odor.
- Chafing wire -- serpentine belt.
- Contaminated brake fluid.
- Zip tie retaining heater control valve.
- Unsecured auxiliary battery.
- Steel brake line @ left side frame leaking brake fluid.
- Front Brake System Components.
 - Friction material groove filled.
 - Friction material glazing and scoring.
 - Brake caliper pistons binding, right brake caliper pistons not retracting properly.
- Windshield Washer reservoir empty.
- Engine rear main seal leaking.

²¹ See Addendum B.



3) 2008 Lincoln Town Car Stretch Limousine, VIN -- 2L1FM88W98X644368²²

- Right Rear Tire, center wear.
- Right Headlamp lens hazed, reduction in luminous intensity.
- Right Windshield Wiper Blade torn.
- Extensive corrosion and rust-through, floor pan areas.
- Extensive corrosion and rust-through, left and right inner rocker panels.
- Power steering fluid, burnt odor.
- Contaminated brake fluid.
- Unsecured auxiliary battery.
- Unsecured primary battery.
- Front Brake System Components.
 - Scoring, left front brake pad.
- Rear Brake System Components.
 - Delamination of friction material.
 - Glazing/rust jacking of friction material.
 - Heavy corrosion.
 - Embedded contamination of friction material.
 - Pitting, outer left rear brake rotor.
- MIL Illumination.

Summary of Safety Inspection Results of Additional Three (3) Limousines – The safety inspections conducted with respect to the additional three (3) limousines of Prestige Limousine revealed multiple deficiencies with each vehicle, the most concerning of which was that of the extensive corrosion and rust-through of the floor pans of the vehicle. This condition results in a reduction of yield strength of the floor pans, and allows for exhaust gases to enter the passenger compartment of the limousines. The three limousines were each found in an unsafe condition for use.

²² See Addendum A.



SUMMARY/CONCLUSION/OPINIONS

On October 6, 2018, a 2001 Ford Excursion stretch limousine transporting seventeen (17) passengers for compensation experienced catastrophic brake failure while descending a lengthy, steep gradient on State Route 30 in Schoharie, New York. The runaway vehicle continued its trajectory to a violent crash sequence near the intersection of State Route 30 and State Route 30A, claiming the lives of twenty (20) people -- two (2) pedestrians, the driver of the limousine, and all seventeen (17) passengers of the limousine.

The vehicle autopsy and related forensic analyses of components of the involved 2001 Ford Excursion stretch limousine, combined with known facts and collision reconstruction results inclusive of vehicle dynamics, hereby provides basis for the following opinions:

- I. The cause of the violent multiple fatality crash of October 6, 2018, at Schoharie, New York is attributable to catastrophic brake failure of the involved 2001 Ford Excursion stretch limousine.
- II. The involved 2001 Ford Excursion stretch limousine exhibited compelling evidence of the protracted history of neglect of proper inspection and maintenance, with specific emphasis expressed regarding braking system component deficiencies of the vehicle.
- III. Federal regulations clearly mandate that it is the duty of the personnel of all companies engaged in commercial vehicle endeavors to ensure the systematic and comprehensive inspection and maintenance of commercial motor vehicles under their control, and to not allow unsafe commercial vehicles to be operated.



In brief summary, the multiple fatality motor vehicle crash of October 6, 2018 involving the 2001 Ford Excursion stretch limousine and resulting in the deaths of two pedestrians, the limousine driver, and all seventeen limousine passengers was the unfortunate result of catastrophic brake failure due to the neglect of mandated commercial vehicle inspections and maintenance by company personnel.

Signed: <i>Brian F. Chase</i>	April 26, 2019
Brian F. Chase, Chief Vehicle Forensics Expert	Date